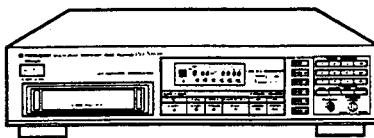




# Service Manual



ORDER NO.  
ARP1713

MULTI-PLAY COMPACT DISC PLAYER

# PD-M610 PD-M510 PD-M410

MODELS PD-M610, PD-M510 AND PD-M410 HAVE SEVEN VERSIONS :

Type	Applicable model			Power requirement	Export destination
	PD - M610	PD - M510	PD - M410		
KU	○	○	○	AC120V only	U.S.A.
KC	○	○	○	AC120V only	Canada
HEM	○	-	○	AC220V,240V (switchable) *	European continent
HB	○	-	-	AC220V,240V (switchable) *	United kingdom
SD	○	○	○	AC110V,120 - 127V,220V,240V (switchable)	Kingdom of Saudi Arabia and General market
SD/G	○	○	-	AC110V,120 - 127V,220V,240V (switchable)	U. S. Military
HP	-	○	○	AC220V,240V (switchable) *	Australia

\* Change the connection wire from Power switch board assembly to Transformer board assembly.

- This service manual is applicable to the PD-M610/KU KC, PD-M510/KU, KC, PD-M410/KU and KC types.
- For the PD-M510/KU type, please refer to pages 65.
- For the PD-M510/KC, PD-M410/KU and KC types, please refer to pages 83.
- For the other types, refer to additional service manual.
- Ce manuel pour le service comprend les explications en français de réglage.
- Este manual de servicio trata del método ajuste escrito en español.

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## 1. SAFETY INFORMATION

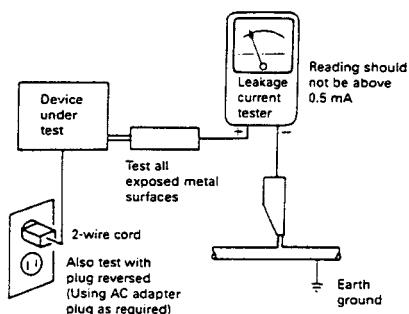
(FOR USA MODEL ONLY)

### 1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

#### LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120 V AC 60 Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5 mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

### 2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

**VAROITUS!**  
LAITE SISALTAA LASERDIODIN. JOKA LAHETTAÄ NAKYMATONTA, SILMILLE VAARALLISTA INFRAPUNASATEILYÄ. LAITTEEN SISÄLLÄ ON LASERDIODIN LAHEISYÖDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.



LASER  
Kuva 1  
Lasersateilyyn varoitusmerkki

**WARNING!**  
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.



LASER  
Picture 1  
Warning sign for laser radiation

**ADVERSEL:**  
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFTRYDERE ER UDE AF FUNKTION UNDGA UDSAETTELSE FOR STRÅLING.

**IMPORTANT**  
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

**VIKTIGT**  
APARATEN INNEHÄLLER LASER AV HÖGRE KLASSEN AN. INGREPP I APPARATEN BOR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

## LABEL CHECK

### Additional Laser Caution

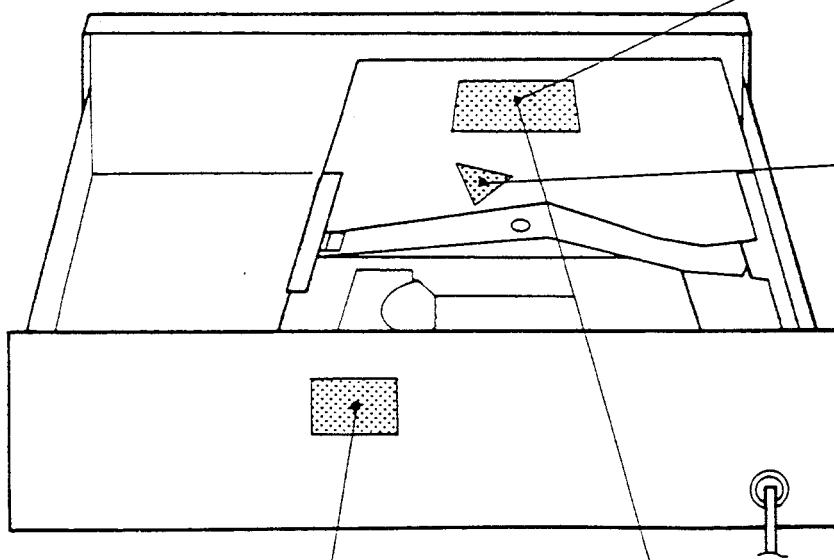
#### 1. Laser Interlock Mechanism

The ON/OFF (L/H) modes of the loading state detection switches, LPS1 (S701) and LPS2 (S702), are detected with the system microcomputer. The laser diode does not oscillate unless these switches are both ON (L). This is the so called clamped state. Consequently, if these switches are short-circuited on purpose, the interlock becomes invalid. Also, in the test mode (refer to page 29), the interlock mechanism does not operate. When pins ④, ⑤ or ⑨ of CXA1081S (IC1) is short-circuited to GND, or when there is a short-circuit between the respective pins of Q1 (fault condition), the laser diode keeps oscillating.

#### 2. If the fault condition described in 1 is induced with the cover open and with the servo mechanism block removed to be turned over, close viewing of the objective lens with the naked eye will cause exposure to a class 1 or higher laser beam.

### HEM model

CAUTION  
LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM  
ADVARSEL  
FARE FOR USYNLIG LASERSTRÅLING VED ÅBNING AF DÆKSEL  
UNOGA AT UDSETTE ØJENENE FOR STRÅLING.  
VORSICHT!  
UNSICHTBARE LASER-STRÄMLUNG TRITT AUF, WENN DECKEL  
ODER KLAPPE GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!  
PRW-175



### HEM and HB models



### HEM and HB models

CLASS 1  
LASER PRODUCT  
VRW-328

### HB model

CAUTION  
INVISIBLE LASER  
RADIATION WHEN OPEN,  
AVOID EXPOSURE  
TO BEAM PRW1018

## 2. EXPLODED VIEWS AND PARTS LIST (FOR PD-M610/KU TYPE)

## NOTES :

- Parts without part number cannot be supplied.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by “ $\odot$ ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

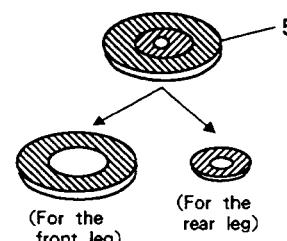
### 2.1 EXTERIOR

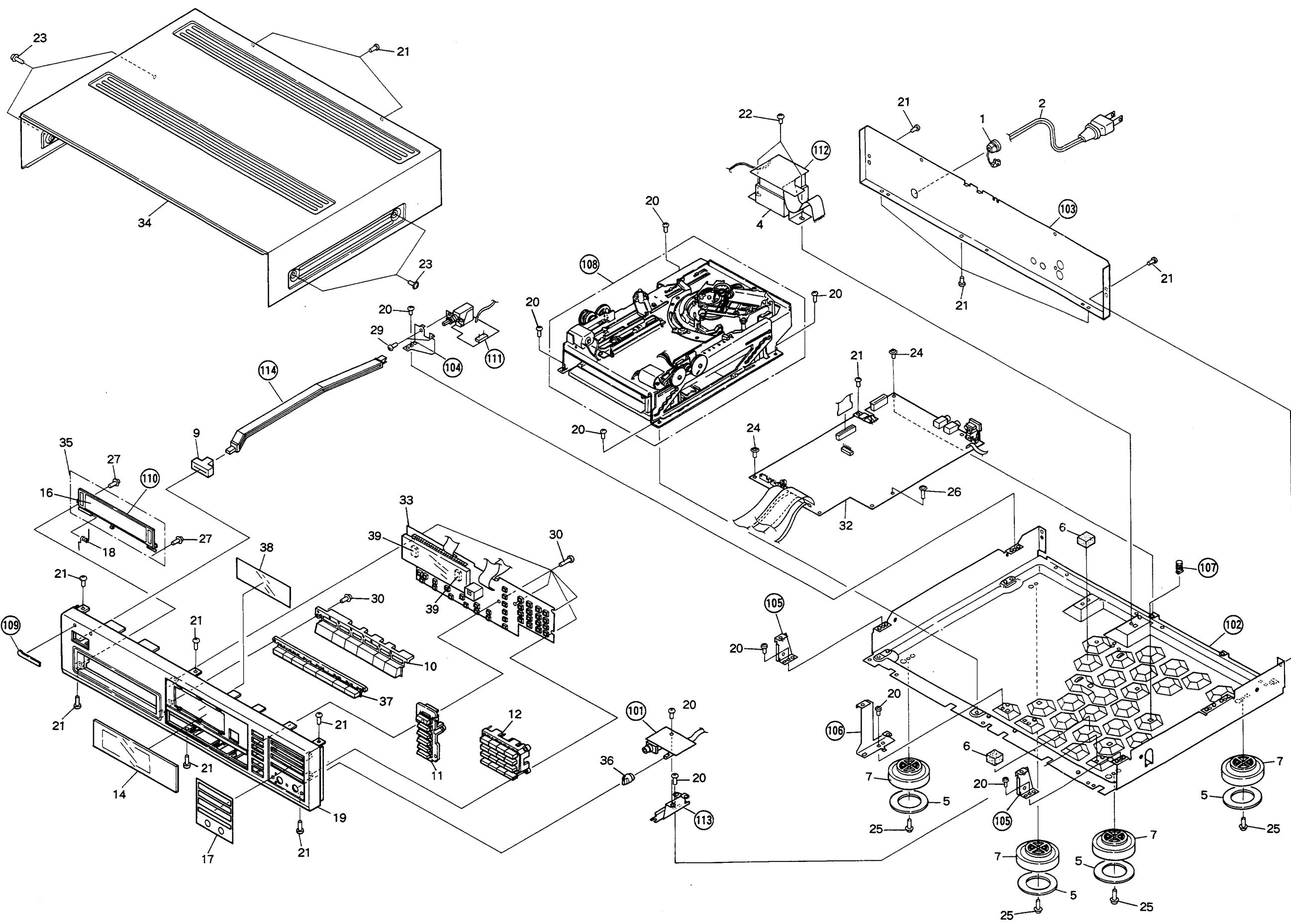
#### Parts List

<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>
$\Delta$	1	CM-22C	Strain relief		30	BBZ30P120FZK	Screw
	2		• • • •		31		• • • •
$\Delta$	3	PDG1002	AC power cord	$\odot$	32	PWZ1605	Main board assembly
$\Delta$	4	PTT1103	Power transformer (AC120V)	$\odot$	33	PWZ1613	Function board assembly
				$\odot$	34	PYY1062	Bonnet
5	PNM1018	Stopper *		35	PYY1107	Door assembly	
6	PNM1059	Cushion		36	PAC1370	Knob (PHONES LEVEL)	
7	PNW1326	Leg (A)		37	PAC1391	Mode button	
8		• • • •		38	PAM1298	Screen	
9	PAC1246	Power button A		39	PEB1022	FL spacer	
10	PAC1390	Function button		101		Headphone board assembly	
11	PAC1389	Disc button		102		Base	
12	PAC1392	Track button		103		Rear panel	
13		• • • •		104		SW angle	
14	PAM1296	Window		105		Angle	
15		• • • •		106		Center angle	
16	PAM1293	Door name plate		107		P.C.B spacer	
17	PAM1297	Phono name plate		108		Multi mechanism assembly	
18	PBH1022	Door spring		109		Name plate	
19	PNW1533	Front panel		110		Door	
20	BBZ30P060FCC	Screw		111		Power switch board	
21	BBZ30P080FZK	Screw		112		assembly	
22	BBZ40P060FMC	Screw				Transformer board	
23	FBT40P080FZK	Screw				assembly	
24	IBZ30P060FCC	Screw		113		Headphone angle	
				114		Joint (POWER)	
25	IBZ30P120FCC	Screw					
26	IBZ30P150FCU	Screw					
27	IPZ30P060FMC	Screw					
28		• • • •					
29	PMZ30P060FCU	Screw					

\* The stopper consist of the big ring part and the small ring part.

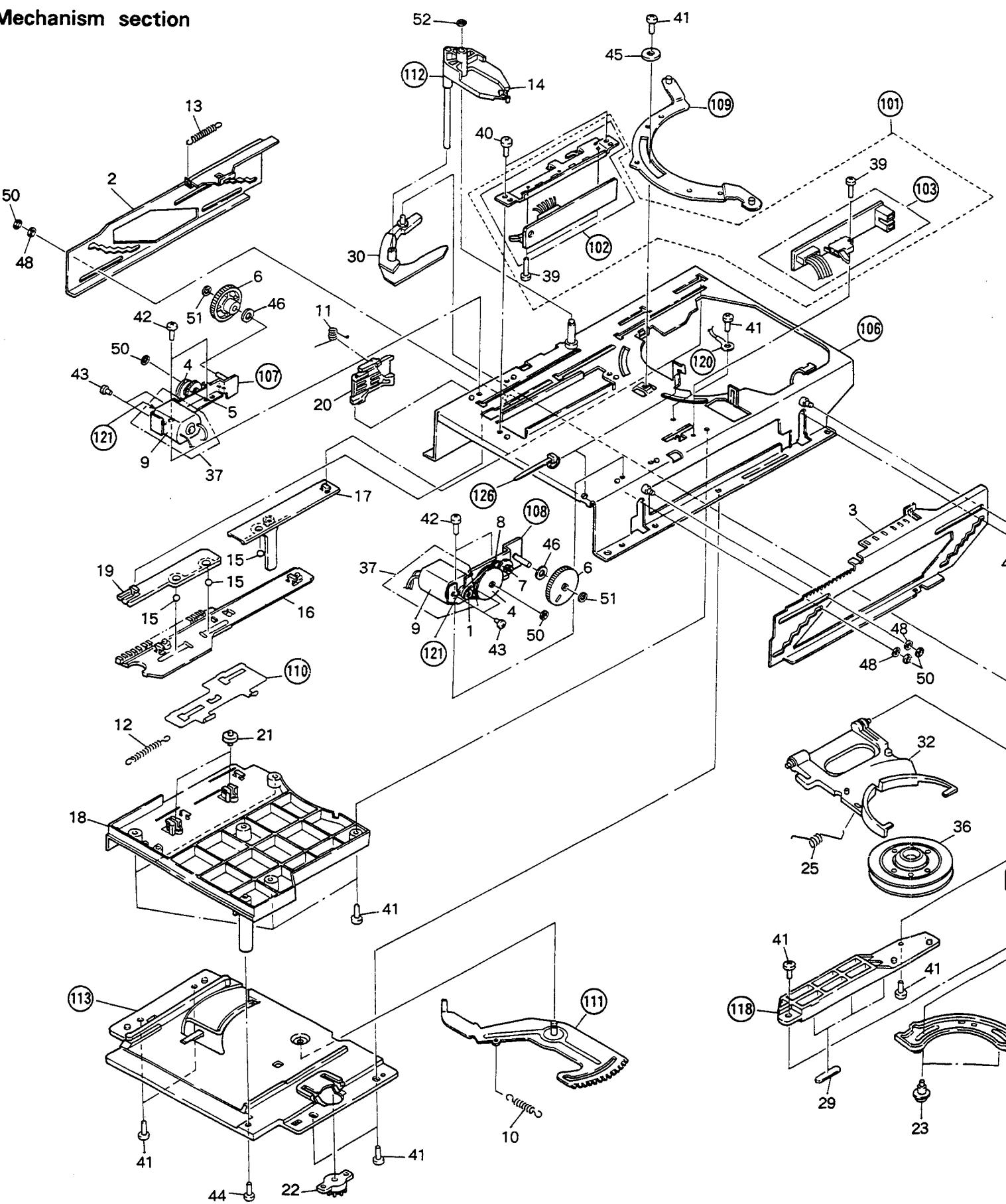
If you stick the stopper to the leg, stick the big ring part to the front leg, and the small ring part to the rear leg.



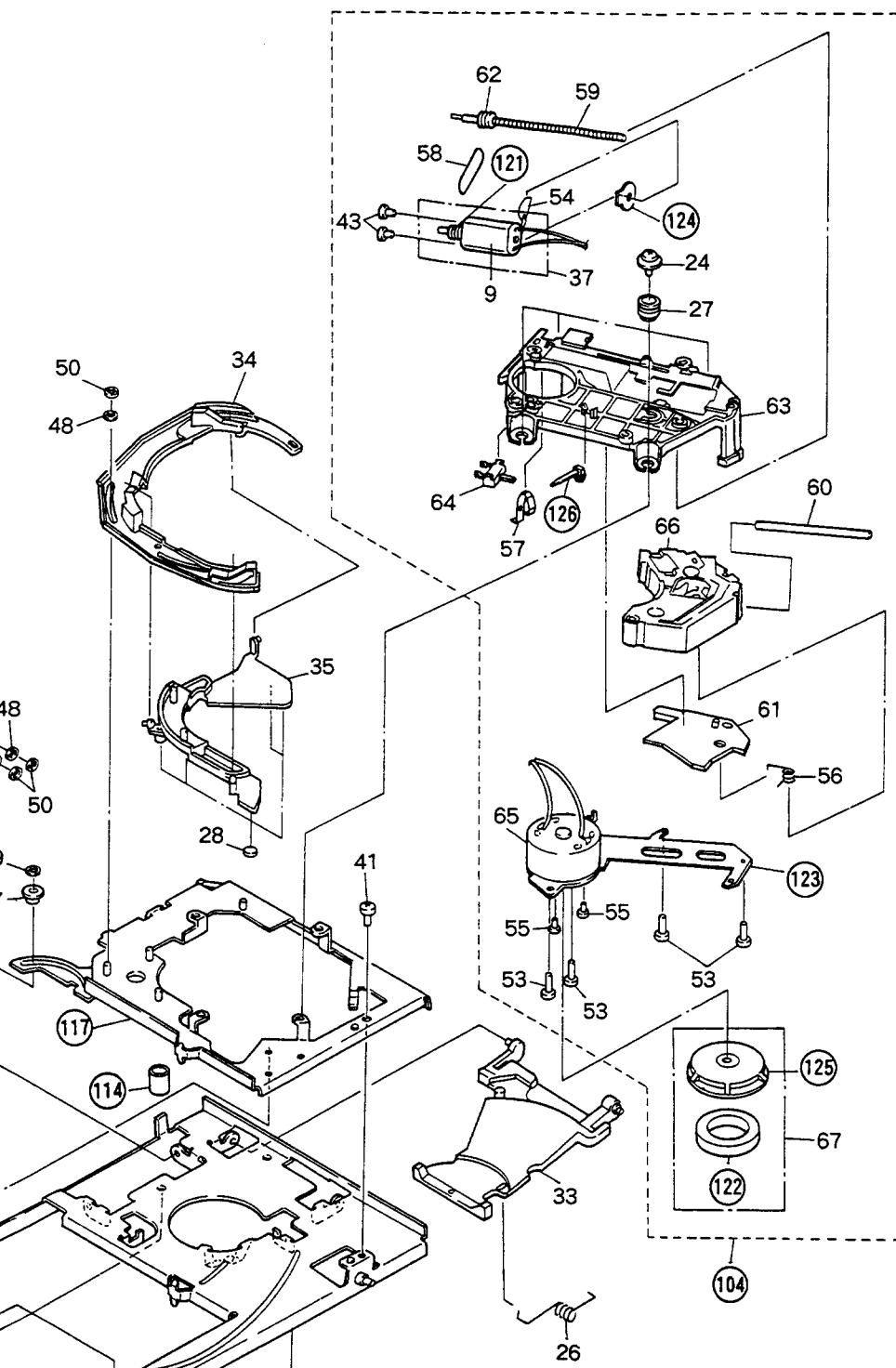


## 2.2 Mechanism section

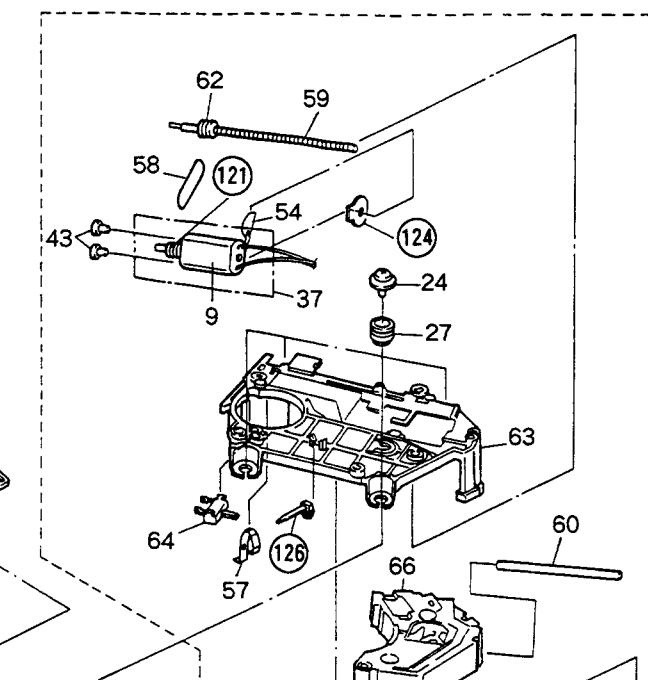
A



B



A



B

C

D

D

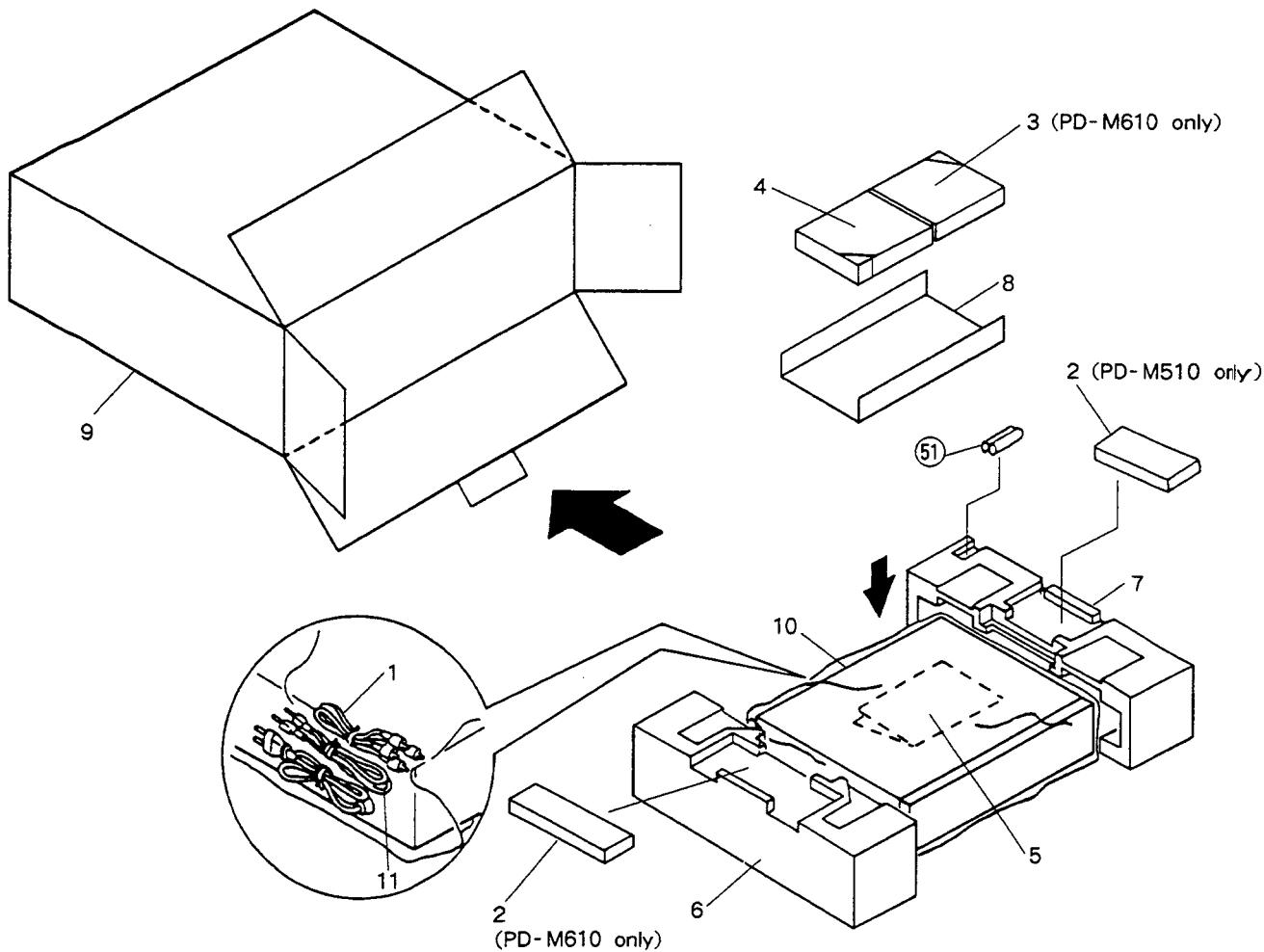
## Parts List of Mechanism Section

<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>
1	PEB1015	Belt		48	WA31D054D050	Washer	
2	PNB1028	Stair (L)		49	WT12D032D025	Washer	
3	PNB1138	Stair (R)		50	WT25D047D025	Washer	
4	PNW1095	Gear pulley		51	WT26D060D013	Washer	
5	PNW1096	Gear		52	WT31D054D025	Washer	
6	PNW1097	Gear		53	BPZ20P080FZK	Screw	
7	PNW1098	Idoler gear		54	CGDYX104M25	Semiconductive ceramic capacitor	
8	PNW1122	Gear		55	PBA1037	Screw M2 × 2.5	
9	PXM1002	Motor (LOADING, DISC SELECT, CARRIAGE)		56	PBH1008	Drive spring	
10	PBH-465	Eject spring		57	PBK1057	Plate spring	
11	PBH1014	Lock spring		58	PEB1072	Belt	
12	PBH1015	SW spring		59	PLA1003	Drive worm	
13	PBH1018	Stair spring		60	PLA1004	Guide bar	
14	PBK1009	Drive spring		61	PNW1063	Carriage plate	
15	PBP-001	Steel ball φ 4		62	PNW1066	Pully	
16	PNW1099	Rack		63	PNW1520	Mechanism chassis	
17	PNW1101	Operation plate		64	PSH1003	Slide switch (INSIDE, S101)	
18	PNW1102	Top guide		65	PYY1109	Spindle motor assembly (motor with oil)	
19	PNW1253	Drive plate		66	PWY1009	Pickup assembly	
20	PNW1395	Lock lever		67	PYY1027	Disc table assembly	
21	PNY-386	Roller		101		Mechanism board assembly	
22	PXC-016	Damper assembly		102		Switch board assembly	
23	PBA-125	Screw		103		Select board assembly	
24	PBA1002	Screw		104		Servo mechanism assembly	
25	PBH1016	Clamper spring (T)		105		• • • •	
26	PBH1017	Clamper spring (B)		106		Main chassis	
27	PEB1014	Float rubber		107		Gear angle (L)	
28	PED1001	Cushion (A)		108		Gear angle (R)	
29	PED1002	Cushion (B)		109		Lever	
30	PNW1105	Rotary lever		110		SM select	
31	PNW1106	Clamper cam		111		Eject lever	
32	PNW1107	Clamper holder (T)		112		Drive lever	
33	PNW1108	Clamper holder (B)		113		Bottom guide	
34	PNW1110	Pressure cam		114		Rubber tube	
35	PNW1111	Upper tray		115		• • • •	
36	PNW1448	Clamper		116		Sub chassis	
37	PYY1025	Motor assembly (LOADING, DISC SELECT, CARRIAGE)		117		Upper chassis	
38		• • • •		118		Upper guide	
39	BBZ20P080FMC	Screw		119		• • • •	
40	BBZ30P060FCC	Screw		120		Earth lead unit	
41	BBZ30P060FMC	Screw		121		Motor pulley	
42	PCZ30P040FMC	Screw		122		Magnet	
43	PMZ20P030FMC	Screw		123		Base plate	
44	PPZ30P080FMC	Screw		124		Carriage M board	
45	WA30F120M100	Washer		125		Disc table	
46	WA31D054D013	Washer		126		Binder	
47	PLA1023	Roller					

### 3. PACKING

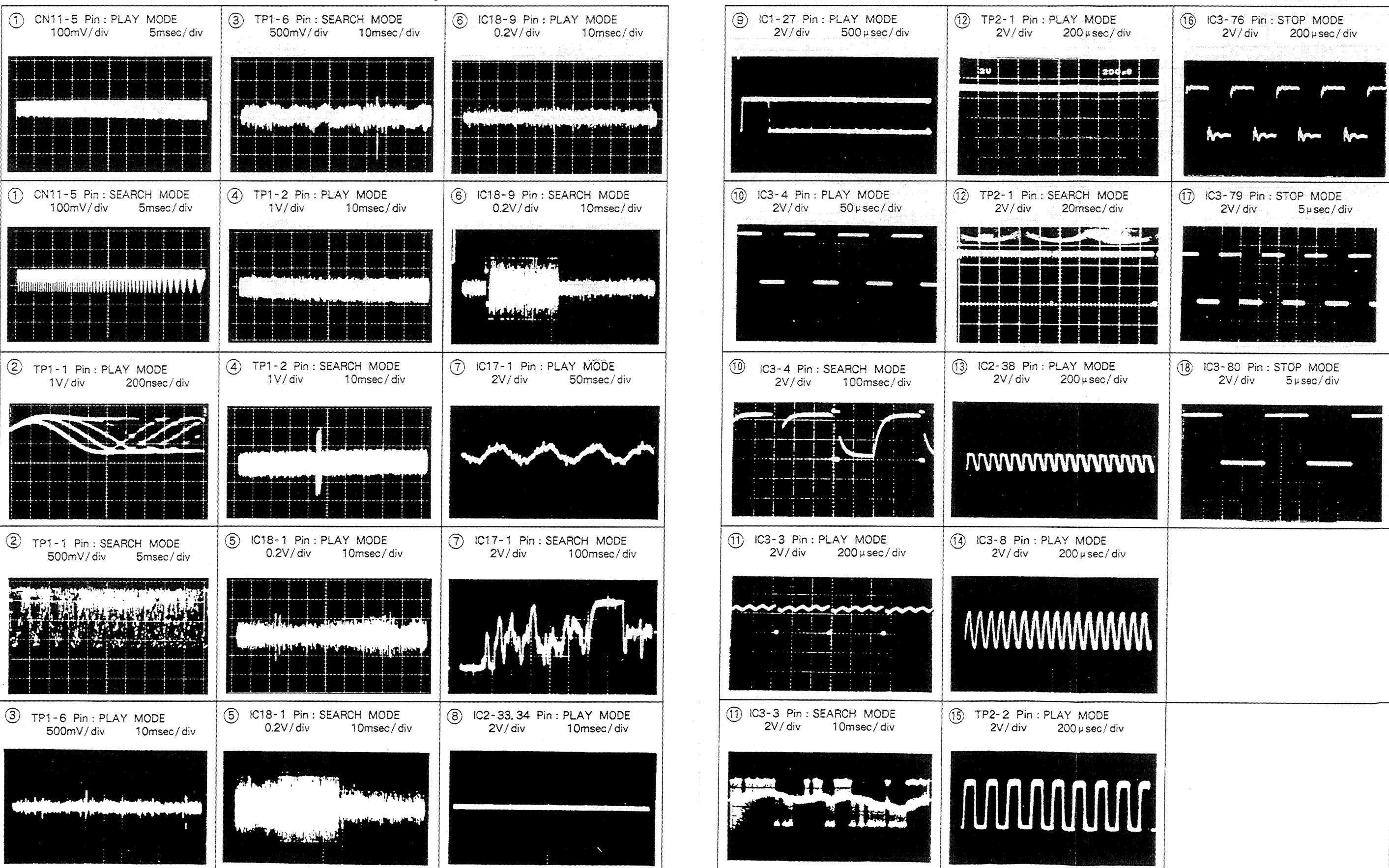
#### Parts List

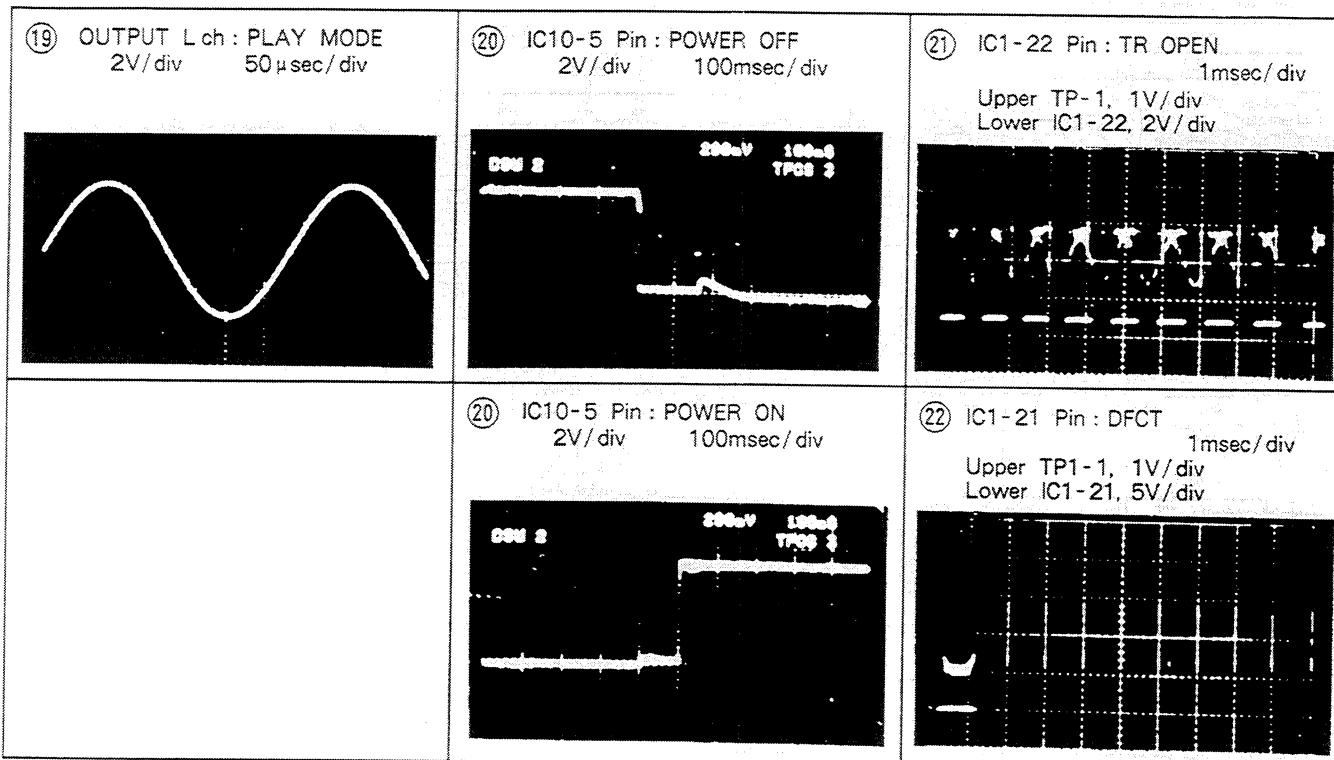
<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>
1	PDE1001		Connection cord with pin plug	6	PHA1099		Protector (L)
2	PWW1032		Remote control unit (PD-M610 only)	7	PHA1100		Protector (R)
	PWW1034		Remote control unit (PD-M510 only)	8	PHC1045		Magazine holder
3	PXA1043		Single magazine assembly (PD-M610 only)	9	PHG1317		CD packing case (PD-M610/KU type)
4	PXA1179		Magazine assembly		PHG1318		CD packing case (PD-M510/KU type)
5	PRB1088		Operating instructions (English)				
	PRB1090		(PD-M610/KU type)	10	Z23-007		Mat sheet
			Operating instructions (English)	11	PDE-319		Connection cord with mini plug
			(PD-M510/KU type)	51			Battery



## WAVE FORMS

NOTE : The encircled numbers denote measuring points in the schematic diagram.





#### 4. SCHEMATIC DIAGRAM (FOR PD-M610/KU TYPE)

##### 1. RESISTORS :

Indicated in  $\Omega$ , 1/4W, 1/6W and 1/8W,  $\pm 5\%$  tolerance unless otherwise noted k ; k $\Omega$ , M ; M $\Omega$ , (F) ;  $\pm 1\%$ , (G) ;  $\pm 2\%$ , (K) ;  $\pm 10\%$ , (M) ;  $\pm 20\%$  tolerance.

##### 2. CAPACITORS :

Indicated in capacity ( $\mu F$ ) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

##### 3. VOLTAGE, CURRENT :

$\square$  : DC voltage (V) at play state.  
 $\Rightarrow$  mA : DC current at play state.  
Value in ( ) is DC current at stop state.

##### 4. OTHERS :

$\Rightarrow$  : Signal route.  
 $\otimes$  : Adjusting point.

The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

\* marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

##### 5. SWITCHES : (The underlined indicates the switch position)

###### OUTSIDE OF P.C.BOARD ASSEMBLY

S101 : INSIDE ON — OFF

###### MAIN BOARD ASSEMBLY

S1 : TEST MODE ON — OFF

###### FUNCTION BOARD ASSEMBLY

S201 : EJECT

S202 : 1

S203 : 2

S204 : 3

S205 : 4

S206 : 5

S207 : 6

S208 : 1

S209 : 4

S210 : 7

S211 : 0

S212 : TIME FADE

S213 : 2

S214 : 5

(TRACK NO.)

S215 : 8

S216 : TIME

S217 : PGM MEMORY

S218 : CLEAR

S219 : 3

S220 : 6

(TRACK NO.)

S221 : 9

S222 : REPEAT

S223 : MANUAL SEARCH (◀◀)

S224 : MANUAL SEARCH (▶▶)

S225 : PLAY

S226 : RANDOM PLAY

S227 : TRACK SEARCH (◀◀)

S228 : TRACK SEARCH (▶▶)

S229 : PAUSE

S230 : STOP

S231 : DELETE

S232 : AUTO FADER IN

S233 : AUTO FADER OUT

S234 : (+ 10)

S235 : ( $\geq 20$ )

###### SWITCH BOARD ASSEMBLY

S801 : LPS1 LOADING POSITION

S802 : LPS2

	STOP	DURING THE LOADING	CLAMP CONDITION PLAY	DURING THE EJECT
S801	ON (H)	OFF (L)	OFF (L)	ON (H)
S802	ON (H)	ON (H)	OFF (L)	OFF (L)

S803 : MZS2 MAGAZINE

S804 : MZS1

	NO MAGAZINE	SIX MAGAZINES	SINGLE
S803	ON (H)	OFF (L)	OFF (L)
S804	OFF (L)	ON (H)	OFF (L)

###### POWER SWITCH BOARD ASSEMBLY

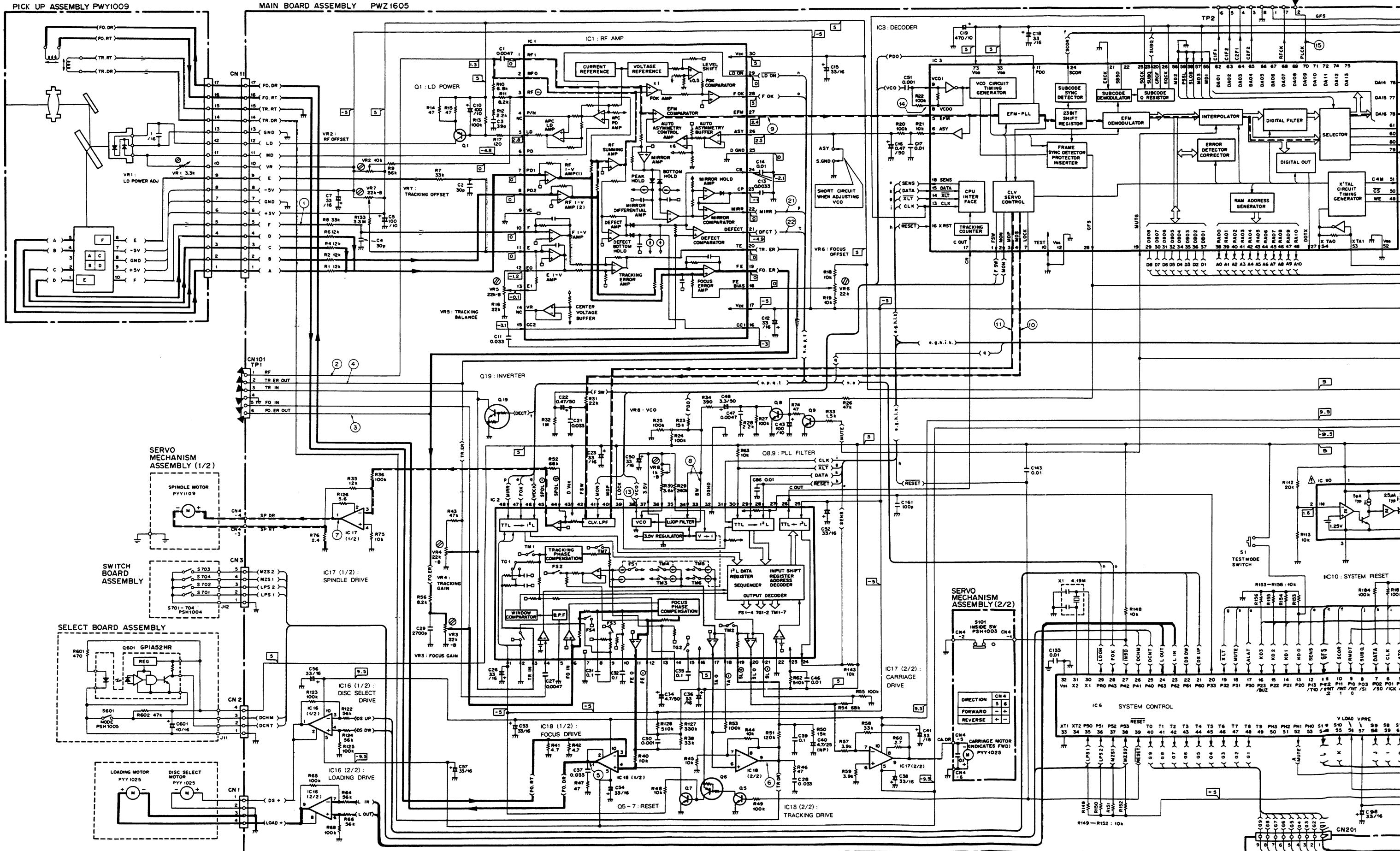
S401 : POWER ON — OFF

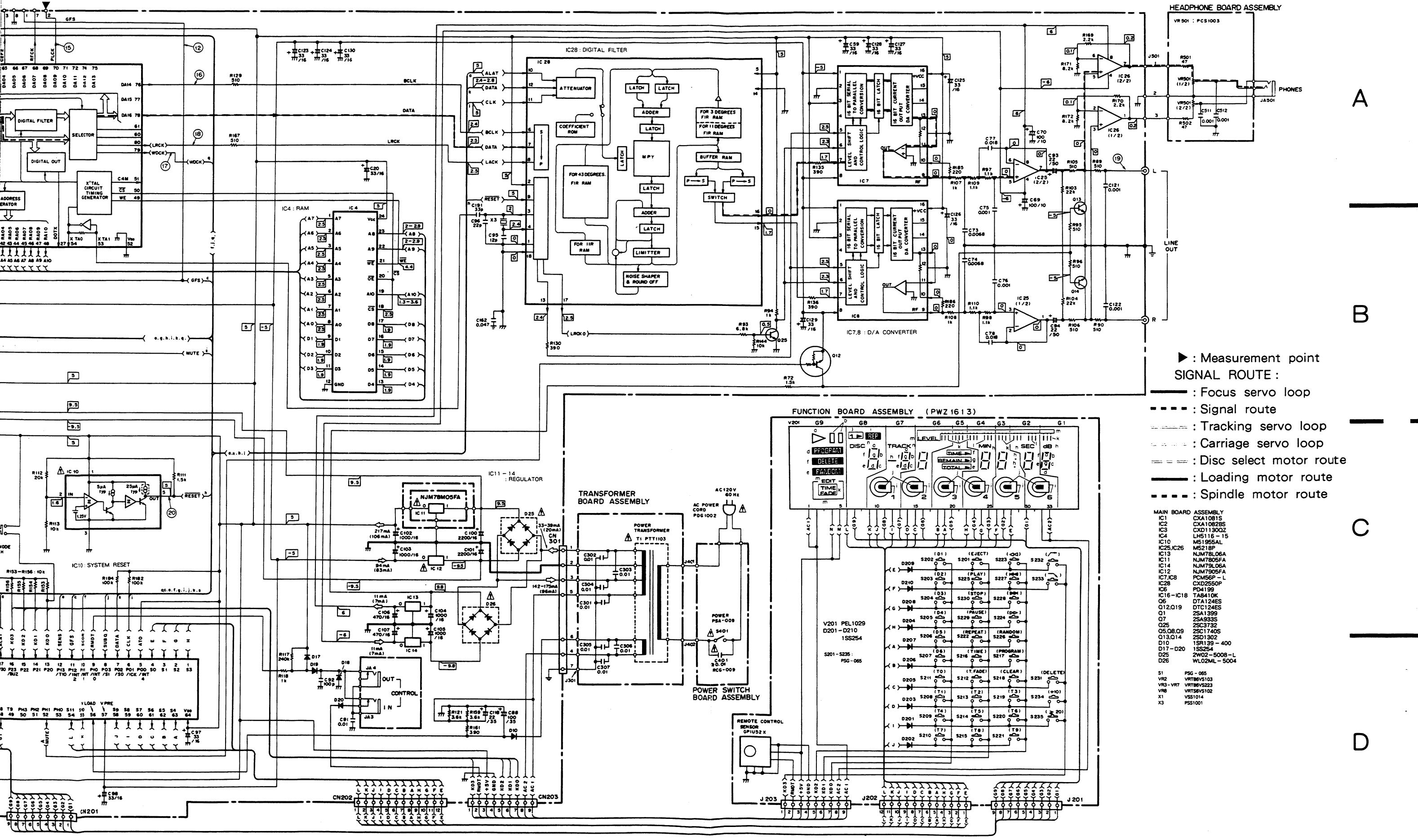
A

B

C

D





**IC2**  
(CXA1082BS)

Pin No.	Voltage	Pin No.	Voltage
1	-5	25	-5
2	0	26	0
3	0	27	5
4	0	28	5
5	0	29	5
6	0	30	5
7	0	31	5
8	0	32	0
9	0	33	2.5
10	0	34	2.5
11	0	35	2.3
12	0	36	2.3
13	0.2	37	2.5
14	0	38	2.4
15	0	39	5
16	5	40	2.5
17	0	41	5
18	0	42	2.5
19	0	43	5
20	0	44	0
21	0	45	0.2 - 0.6
22	0	46	2.5
23	-4.1	47	5
24	5	48	0

**IC3**  
(CXD1130QZ)

Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5
2	5	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 - 2.9
7	5	47	2.0 - 2.9
8	2.4	48	1.3 - 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5	53	2.2
14	5	54	2.2
15	5	55	5
16	5	56	0
17	0	57	5
18	5	58	0
19	0	59	0
20	5	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5	65	0
26	5	66	0
27	2.5	67	0
28	5	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5
32	1.9	72	0
33	5	73	5
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

**IC6**  
(PD4199)

Pin No.	Voltage	Pin No.	Voltage
1	-12.5 -- 12.7	33	0
2	-19.2 -- 22.7	34	5
3	-9.9 -- 13.2	35	0
4	-12.5 -- 15.4	36	0
5	5	37	0
6	5	38	5
7	2.5 - 2.8	39	5
8	0.2 - 2.7	40	-23.1
9	4.9	41	-23.1
10	0.1	42	-23.2
11	5	43	-23.1
12	5	44	-23.1
13	0	45	-23.1
14	0	46	-23.1
15	0	47	-23.1
16	0	48	-23.1
17	5	49	0
18	0	50	0
19	5	51	5
20	5	52	5
21	0	53	0
22	0	54	-19.6 -- 19.8
23	0	55	-7.1 -- 7.4
24	0	56	-26.2
25	5	57	-5
26	5	58	-19.5 -- 19.9
27	5	59	-4.3 -- 4.6
28	5	60	-9.3 -- 12.6
29	0	61	-0.9
30	2.4	62	-3.9 -- 7
31	2.6	63	-9.3 -- 15.5
32	0	64	5

## 5. P. C. BOARDS CONNECTION DIAGRAM (FOR PD-M610/KU TYPE)

P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
		Diode			Styrol capacitor
		LED			Power capacitor
		Varactor			Semi-fixed resistor
		Tact switch			Resistor array
		Inductor			Resistor
		Coil			Resonator
		Transformer			Thermistor
		Filter			

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with shows negative terminal.
4. The diode marked with shows cathode side.
5. The transistor terminal marked with shows emitter.

1

2

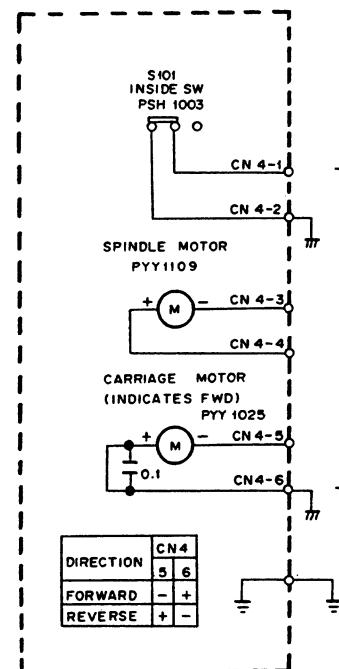
3

4

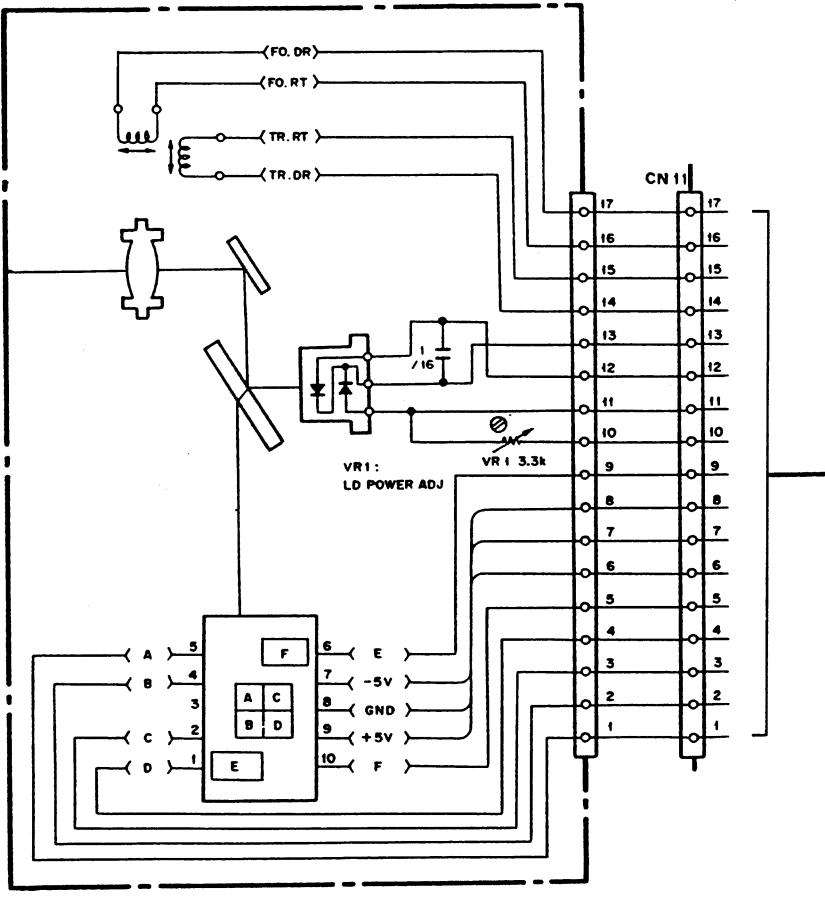
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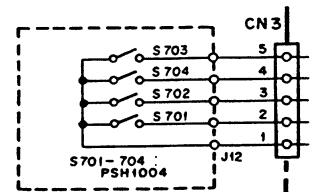
**SERVO MECHANISM ASSEMBLY**



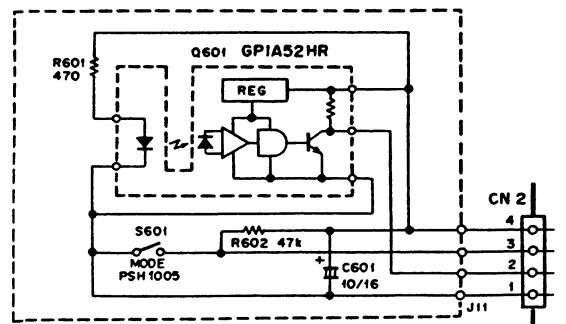
**PICKUP ASSEMBLY (PWY1009)**



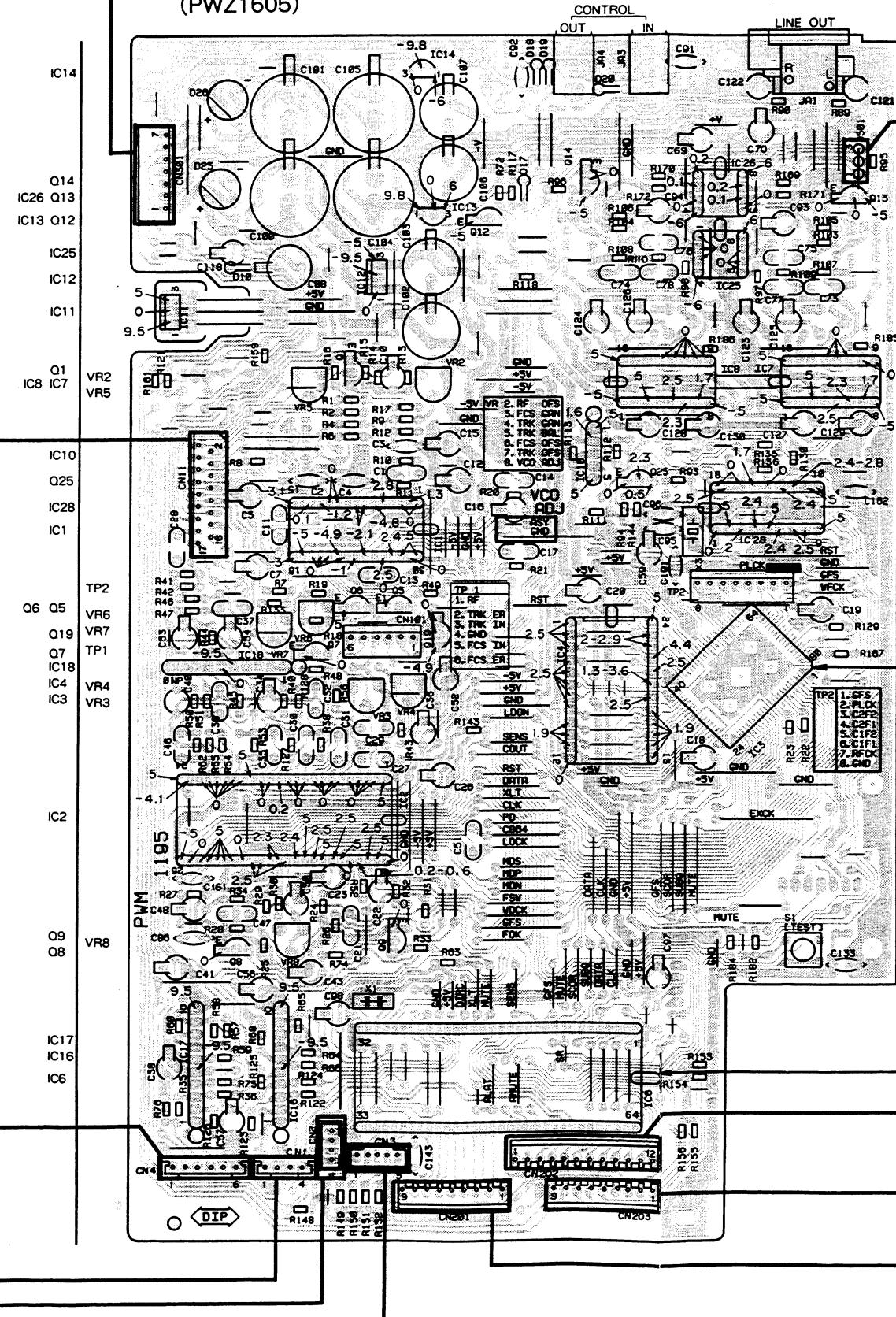
**SWITCH BOARD ASSEMBLY**



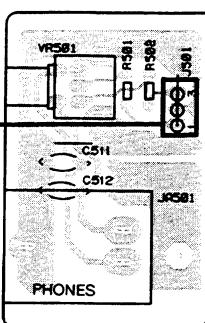
**SELECT BOARD ASSEMBLY**



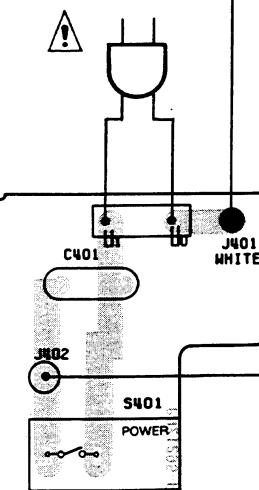
**MAIN BOARD ASSEMBLY (PWZ1605)**



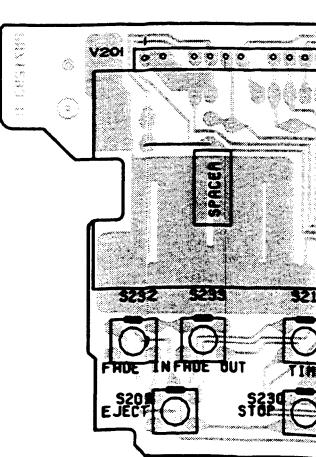
**HEADPHONE BOARD ASSEMBLY**



AC POWER CORD  
AC120V  
60Hz



**POWER SWITCH BOARD ASSEMBLY**



1

2

3

4

5

6

4

5

6

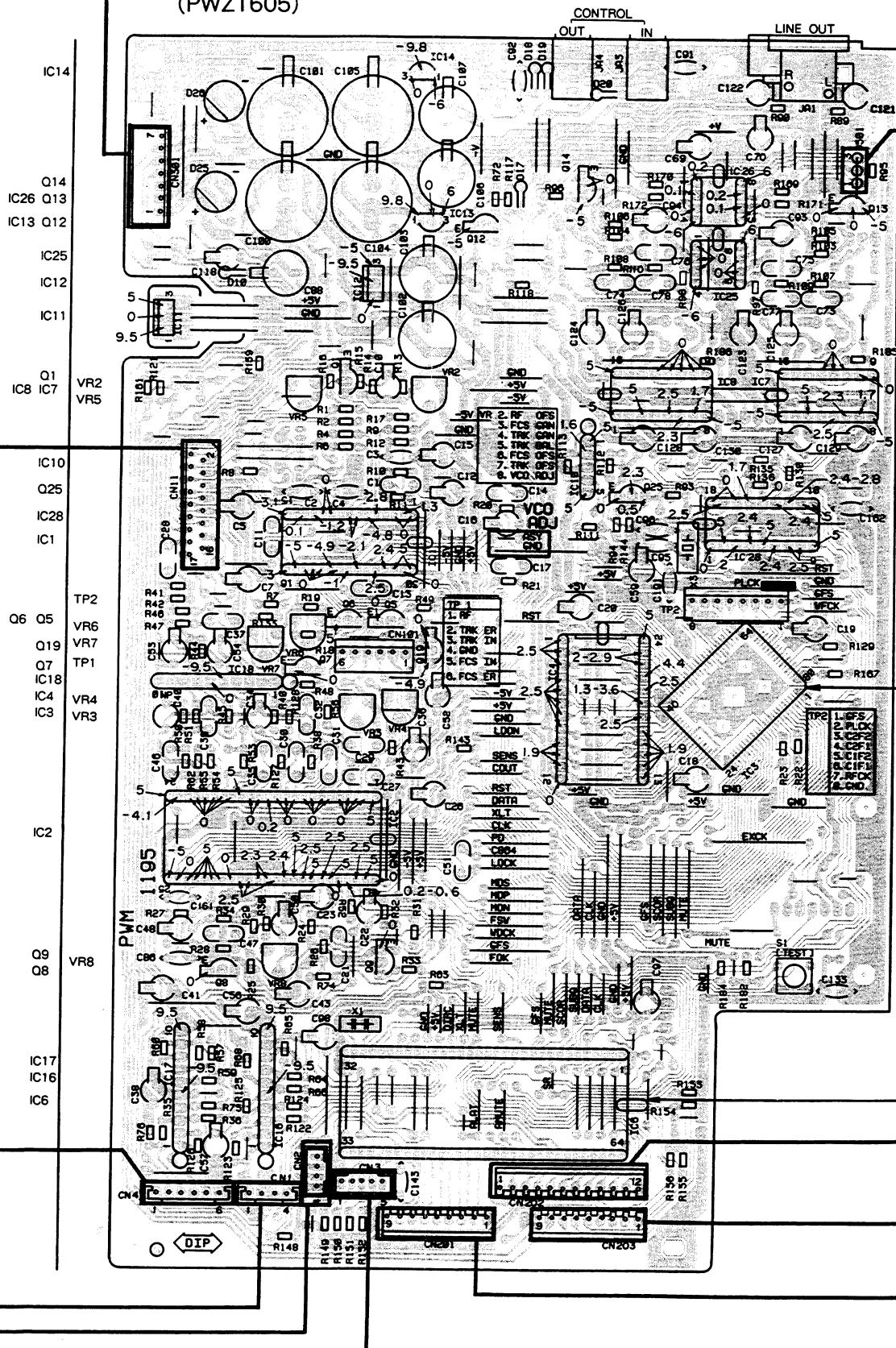
7

8

9

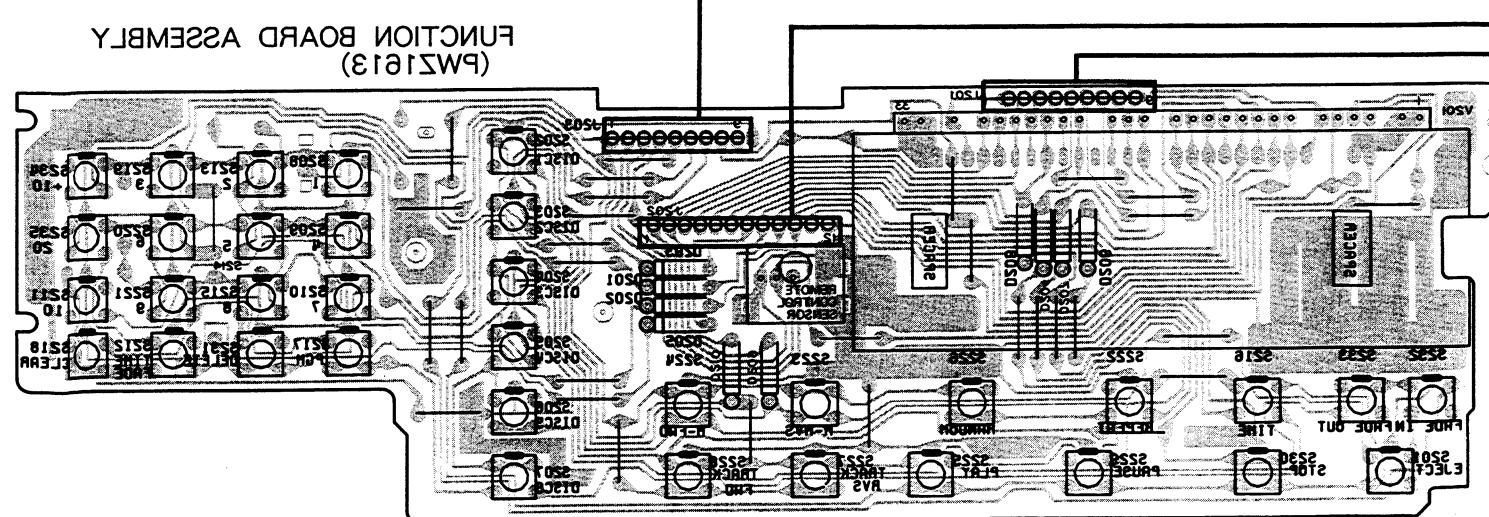
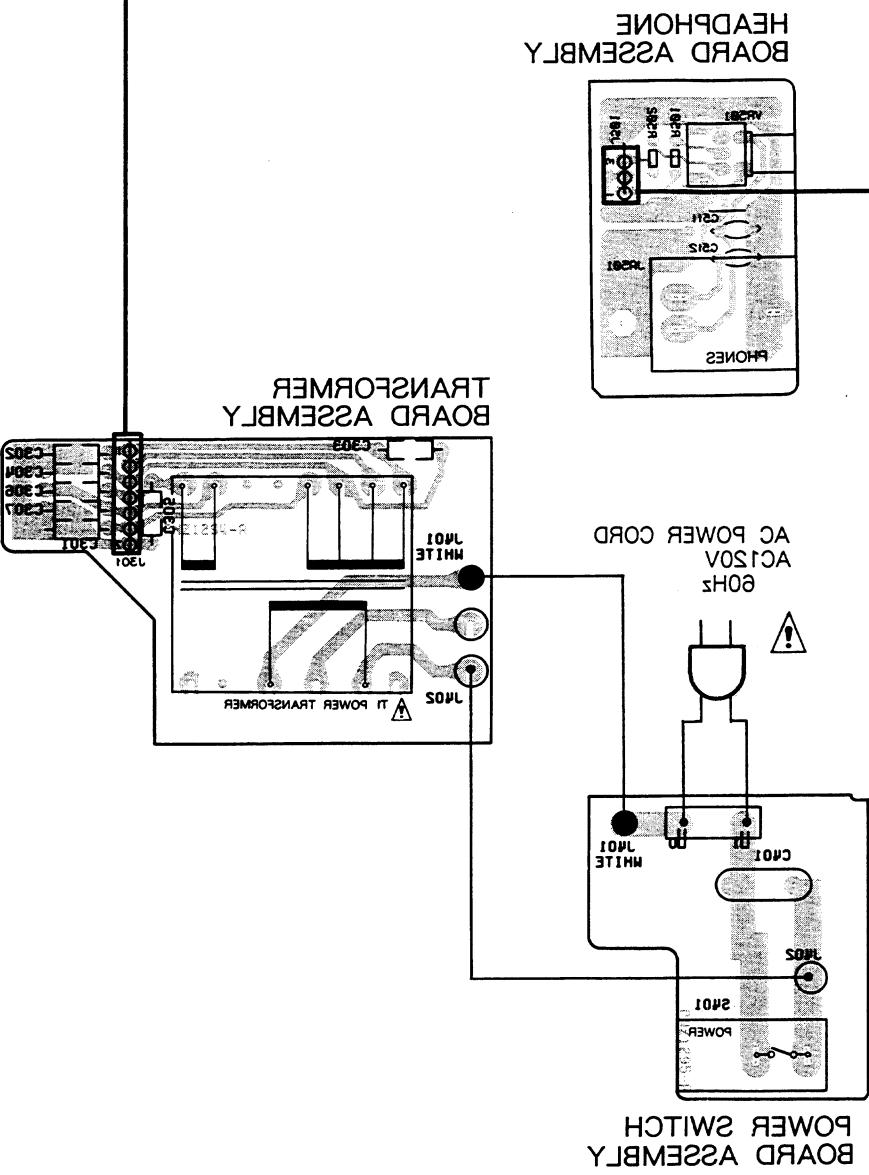
PD-M610

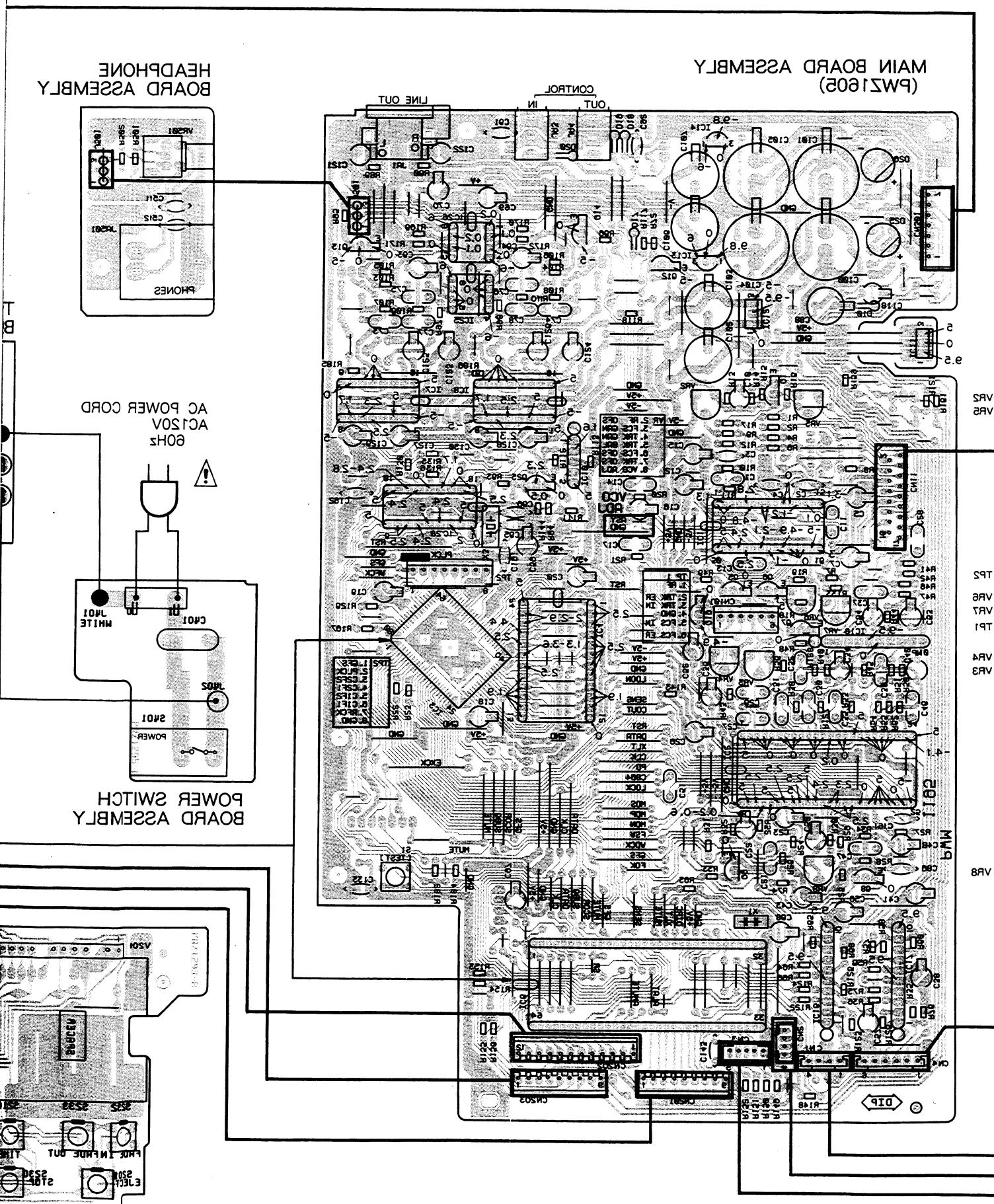
MAIN BOARD ASSEMBLY  
(PWZ1605)



This P.C.B. connection diagram is viewed from the foil side.

No.	Pin	Voltages	No.	Pin	Voltages
1	1	-1.25 - 1.25	33	0	0
2	5	-1.25 - 1.25	34	5	0
3	3	-0.9 - 1.35	35	0	0
4	4	-1.25 - 1.25	36	0	0
5	2	-1.25 - 1.25	37	0	0
6	6	-1.25 - 1.25	38	2	0
7	7	2	39	2	0
8	8	2	40	36	0
9	9	0.5 - 5.7	41	2	-33.1
10	10	0.1	42	43	-33.1
11	11	2	44	2	-33.1
12	12	0	45	2	-33.1
13	13	0	46	2	-33.1
14	14	0	47	2	-33.1
15	15	0	48	0	0
16	16	0	49	0	0
17	17	0	50	0	0
18	18	2	51	2	0
19	19	0	52	2	0
20	20	0	53	0	0
21	21	2	54	0	0
22	22	0	55	0	0
23	23	0	56	0	0
24	24	0	57	0	0
25	25	0	58	0	0
26	26	0	59	0	0
27	27	0	60	0	0
28	28	0	61	0	0
29	29	0	62	0	0
30	30	0	63	0	0
31	31	0	64	0	0
32	32	0	65	0	0
33	33	0	66	0	0
34	34	0	67	0	0
35	35	0	68	0	0
36	36	0	69	0	0
37	37	0	70	0	0
38	38	0	71	0	0
39	39	0	72	0	0
40	40	0	73	0	0





## 6. ELECTRICAL PARTS LIST (FOR PD-M610/KU TYPE)

### NOTES :

- Parts without part number cannot be supplied.
- Parts marked by “◎” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω → 56 × 10 <sup>1</sup> → 561	RD1/4PS 5 6 1 J
47k Ω → 47 × 10 <sup>3</sup> → 473	RD1/4PS 4 7 3 J
0.5 Ω → 0R5	RN2H 0 R 5 K
1 Ω → 010	RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).  
5.62k Ω → 562 × 10<sup>1</sup> → 5621 RN1/4SR 5 6 2 1 F

### Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Power switch board assembly	
	Switch board assembly	
	Select board assembly	
◎	Function board assembly	PWZ1613
◎	Main board assembly	PWZ1605
	Transformer board assembly	
	Headphone board assembly	
△	Strain relief	CM-22C
△	AC power cord	PDG1002
△	Power transformer	PTT1103
	Pickup assembly	PWY1009
	Spindle motor	PXM1001
	Motor assembly (LOADING,DISC SELECT, CARRIAGE)	PYY1025
	S101 Slide switch (INSIDE)	PSH1003
	Remote control unit	PWW1032

### Power Switch Board Assembly

#### SWITCH

Mark	Symbol & Description	Part No.
△	S401 Push switch (POWER)	PSA-009

#### CAPACITOR

Mark	Symbol & Description	Part No.
△	C401 (0.01μF)	RCG-009

### Switch Board Assembly

#### SWITCHES

Mark	Symbol & Description	Part No.
	S701 - S704 Slide switch (LOADING POSITION, MAGAZINE)	PSH1004

### Select Board Assembly

#### SEMICONDUCTOR

Mark	Symbol & Description	Part No.
	Q601	GP1A52HR

#### SWITCH

Mark	Symbol & Description	Part No.
	S601 Slide switch (MODE)	PSH1005

#### CAPACITOR

Mark	Symbol & Description	Part No.
	C601	CEAL100M16

#### RESISTORS

Mark	Symbol & Description	Part No.
	R601,R602	RD1/6PM □□□ J

### ◎ Function Board Assembly (PWZ1613)

#### SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D201 - D210	1SS254

#### SWITCHES

Mark	Symbol & Description	Part No.
	S201 - S235 Tact switch EJECT, DISC (1-6), TRACK No. (0-10, +10, ≥ 20), TIME FADE EDIT, TIME, PGM, CLEAR, REPEAT, MANUAL SEARCH (◀◀, ▶▶), PLAY, RANDOM PLAY, TRACK SEARCH (◀◀, ▶▶), PAUSE, STOP, DELETE, AUTO FADER (IN, OUT)	PSG-065

#### OTHERS

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube Remote control sensor	PEL1029 GP1U52X

## ① Main Board Assembly (PWZ1605)

## SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1130QZ
	IC4	LH5116-15
	IC7,IC8	PCM56P-L
	IC10	M51955AL
	IC25,IC26	M5218P
△	IC13	NJM78L06A
△	IC11	NJM7805FA
△	IC14	NJM79L06A
△	IC12	NJM7905FA
	IC28	CXD2550P
△	IC6	PD4199
△	IC16 – IC18	TA8410K
	Q6	DTA124ES
	Q12,Q19	DTC124ES
	Q1	2SA1399
	Q7	2SA933S
	Q25	2SC3732
	Q5,Q8,Q9	2SC1740S
△	Q13,Q14	2SD1302
△	D26	WL02ML-5004
△	D25	2WL02-5008-L
	D10	1SR139-400
	D17 – D20	1SS254

## SWITCH

Mark	Symbol & Description	Part No.
	S1 Tact switch (TEST MODE)	PSG-065

## CAPACITORS

Mark	Symbol & Description	Part No.
C2,C4	CCCCH300J50	
C95	CCCCH120J50	
C96	CCCCH220J50	
C191	CCCCH330J50	
C3	CCCCH390J50	
C92,C161	CCCSL101J50	
C88	CEAS101M35	
C102 – C105	CEAS102M16	
C118	CEAS220M35	
C40	CEANP4R7M25	
C16,C22	CEASR47M50	
C5,C10,C43,C69,C70	CEAS101M10	
C93,C94	CEAS220M50	
C100,C101	CEAS222M16	
C48	CEAS3R3M50	
C7,C12,C15,C18,C20,C23,C26, C36,C38,C41,C50,C52 – C54,C56, C57,C59,C97,C98,C123 – C130	CEAS330M16	
C34	CEAS4R7M50	
C19,C106,C107	CEAS471M10	

Mark	Symbol & Description	Part No.
	C86,C91,C133,C143	CKCYF103Z50
	C30,C51	CQMA102K50
	C14,C17,C46	CQMA103K50
	C31,C32,C35,C39	CQMA104K50
	C29	CQMA272J50
	C13	CQMA332J50
	C162	CKCYF473Z50
	C11,C21,C28,C37	CQMA333K50
	C75,C76	CQMA102J50
	C1,C27,C47	CQMA472J50
	C77,C78	CQMA183J50
	C121,C122	CQSA102J50
	C73,C74	CQMA682J50

## RESISTORS

Mark	Symbol & Description	Part No.
R30	Metal thin film	RN1/6PQ3601F
VR2	Semi-fixed (10k)	VRTB6VS103
VR3 – VR7	Semi-fixed (22k)	VRTB6VS223
VR8	Semi-fixed (1k)	VRTS6VS102
	Other resistors	RD1/6PM□□□ J

## OTHERS

Mark	Symbol & Description	Part No.
JA1	2P Pin jack (OUTPUT)	PKB1009
X3	Crystal resonator	PSS1001
X1	Ceramic resonator	VSS1014
JA3,JA4	Remote control jack	RKN1004

## Transformer Board Assembly

## CAPACITORS

Mark	Symbol & Description	Part No.
C301,C303		CKPYF103Z50
C302,C304 – C307		CKPYX103N25

## Headphone Board Assembly

## CAPACITORS

Mark	Symbol & Description	Part No.
C511,C512		CKCYF102Z50

## RESISTORS

Mark	Symbol & Description	Part No.
VR501		PCS1003
R501,R502		RD1/6PM470J

## OTHERS

Mark	Symbol & Description	Part No.
JA501	Headphone jack	RKN1001

## 7. ADJUSTMENTS

The adjustment items of this model should be performed in the order as shown below.

### • Adjustment and check items

1. Tracking offset focus offset and RF offset adjustmens
2. RF level adjustment
3. LD (Laser Diode) output power confirmation
4. Focus lock and spindle lock confirmation
5. Grating adjustment
6. Tracking balance adjustment
7. Tangential adjustment
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment
11. Method to confirm S character (FOCUS ERROR)

### • Measuring Equipment

1. Dual trace oscilloscope
2. Laser power meter
3. Test disc (YEDS - 7)
4. Tracking balance adjustment filter
5. Loop gain adjustment filter
6. Signal generator
7. Frequency counter
8. Other general tools

### • Test Mode

#### Test Mode setting and cancellation procedures

- (1) To set the Test Mode, turn the POWER switch of the player (S401) ON pushing the TEST MODE SWITCH (S1).
- (2) To cancel the Test Mode, simply turn the POWER switch of the player OFF.

The various key functions in the Test Mode are listed in Table 7-1.

### • Adjustment VRs and their names

- VR1 : Laser power
- VR2 : RF offset (RF.OFS)
- VR3 : Focus gain (FCS.GAN)
- VR4 : Tracking gain (TRK.GAN)
- VR5 : Tracking balance (TRK.BAL)
- VR6 : Focus offset (FCS.OFS)
- VR7 : Tracking offset (TRK.OFS)
- VR8 : VCO adjustment (VCO.ADJ)

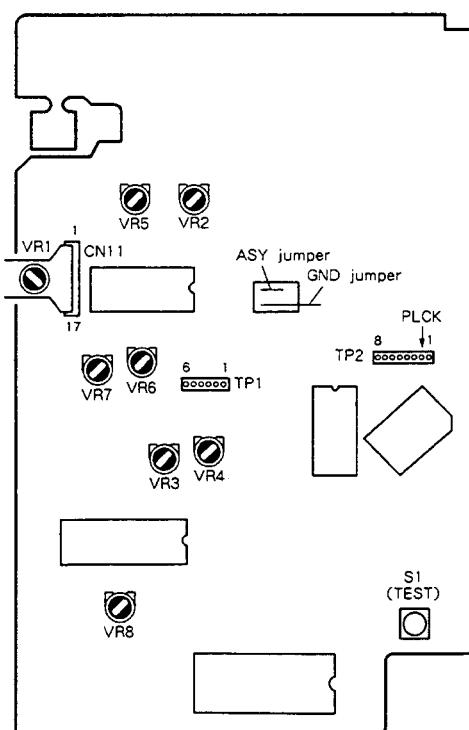


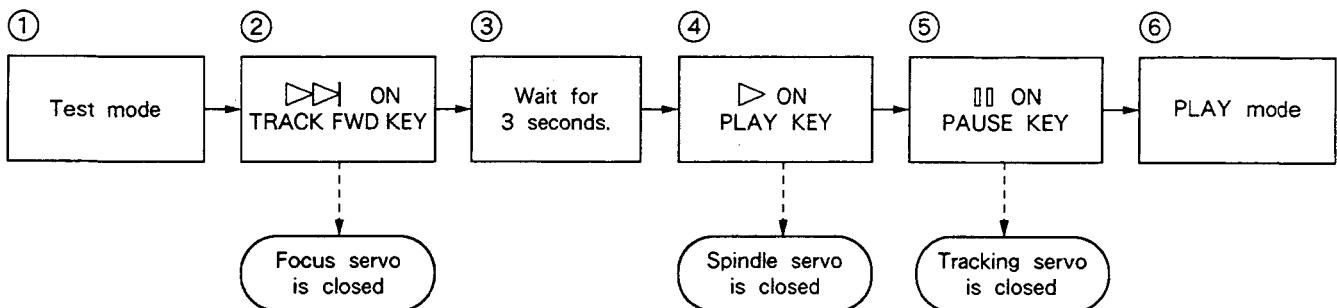
Fig. 7-1 Adjusting point

In the Test Mode each servo circuit can be closed and opened by separate operations. Consequently each servo must be closed one at a time (in serial sequence) to set PLAY mode.

Note that PLAY mode is not activated by simply pressing the PAUSE key (II) in the Test Mode.

Example : Switching from STOP to PLAY mode.

- \* The each servo mechanisms operate in a serial sequence in the Test Mode.



### • Key Functions in Test Mode

Symbol	Key name	Function during test mode	Description
▶	TRACK FWD	Focus servo is closed.	Laser diode lights up. Actuator is moved up/down, then focus servo is closed.
▷	PLAY	Spindle servo is closed.	Spindle starts to rotate and the servo is closed when it turns into the CLV-A servo mode.
II	PAUSE	Tracking servo is closed/opened.	Performs toggle operation. Closing the tracking servo and becomes PLAY mode by depressing the key (Focus servo and spindle servo must be closing), and PAUSE indicator lights up. Tracking servo opens by depressing the key again.
<<	MANUAL SEARCH REV	Carriage moves in reverse direction. (towards disc center)	Carriage is moved towards disc center at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
▷	MANUAL SEARCH FWD	Carriage moves in forward direction. (towards disc end)	Carriage is moved towards disc end at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
□	STOP	STOP	All servos are opened.
△	EJECT	(CD Magazine) EJECT	CD Magazine is ejected. However, pickup does not return to the park position. Moreover, even when disc is closed the pickup remains as is.

Table 7-1

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
1	<b>TRACKING OFFSET, FOCUS OFFSET AND RF OFFSET ADJUSTMENT</b>					
			TP1 Pin 2 (TRK. ERR) TP1 Pin 6 (FCS. ERR) TP1 Pin 1 (RF OUTPUT)	VR5 (TRK. BAL) VR7 (TRK. OFS) VR6 (FCS. OFS) VR2 (RF. OFS)	Tracking offset 45° 0V ± 50mV  FOCUS offset 0V ± 50mV  RF offset 100mV ± 50mV	<ul style="list-style-type: none"> <li>Set to TEST mode. (See page 29.)</li> <li>Turn VR5 TRK.BAL (Tracking balance) volume clockwise 45° from the center.</li> <li>Adjust with VR7 TRK.OFS (Tracking offset) volume so that the voltage of pin 2 TRK.ERR (Tracking error) of TP1 becomes 0V ± 50mV.</li> <li>Adjust VR6 FCS.OFS (focus offset) so that the FCS.ERR (focus error) voltage at TP1 pin 6 becomes 0V ± 50mV.</li> <li>Adjust VR2 RF.OFS (RF offset) so that the RF output voltage at TP1 pin 1 becomes 100mV ± 50mV.</li> </ul>
2	<b>RF LEVEL ADJUSTMENT</b>					
			TP1 Pin 1 (RF)	VR1 Laser power	1.5Vp-p ± 0.2V	<ul style="list-style-type: none"> <li>Set to TEST mode. (See page 29.)</li> <li>Play TEST disc and connect probe of an oscilloscope to pin 1 RF (RF output) of TP1 and measure the P-P voltage of RF waveform.</li> <li>Adjust VR1 (Laser power) so that the value is within 1.5Vp-p ± 0.2V.</li> </ul>
3	<b>LD (LASER DIODE) OUTPUT POWER CONFIRMATION</b>					
					Confirmation : less than 0.13mW	<ul style="list-style-type: none"> <li>Set to TEST mode. (See page 29.)</li> <li>Press TRACK FWD key (▷▷ ) and turn ON LD (laser diode).</li> <li>Place sensor of the laser power meter immediately above the object lens and confirm that the output power of the LD is less than 0.13mW.</li> </ul>
4	<b>FOCUS LOCK AND SPINDLE LOCK CONFIRMATION</b>					
	0.5V/div	100msec /div	TP1 Pin 1 (RF output)		RF output exists  Normal rotation	<ul style="list-style-type: none"> <li>Set TEST disc.</li> <li>Set to TEST mode. (See page 29.)</li> <li>Shift the pickup close to the center of the disc by pressing the MANUAL SEARCH FWD key (▷▷). * Note that this step must be performed.</li> <li>Observe pin 1 RF (RF output) of TP1 with an oscilloscope and confirm that the RF signal is output after pressing the TRACK FWD key (▷▷ ).</li> <li>Press PLAY key (▷) and be sure that the disc rotates in normal direction at almost the specified speed (as it is close to the center of the disc, the rotating speed is around 300 rpm) and not rotates abnormally or inversely.</li> </ul>

Step No.	Oscilloscope Setting	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V				
<b>5 GRATING ADJUSTMENT</b>					
					<ul style="list-style-type: none"> <li>Set to TEST mode. (See page 29.)</li> <li>Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (<math>\triangleright\triangleright</math>) so that the grating adjustment screw of the pickup can be seen through the oval hole of the upper side of the servo mechanism.</li> <li>Insert the <math>\ominus</math> screwdriver into the adjusting hole from the upper side of the mechanism as shown in Fig. 7-2, and confirm that the grating screw turns.</li> <li>Press TRACK FWD key (<math>\triangleright\triangleright</math>) and PLAY key (<math>\triangleright</math>) sequentially and close the focus servo and spindle servo. (Do not close the tracking servo.)</li> <li>Observe the waveform of pin 2 TRK.ERR (Tracking error) of TP1 with an oscilloscope. At this point, insert a 4kHz cutoff low-pass filter. (Fig. 7-3)</li> </ul>

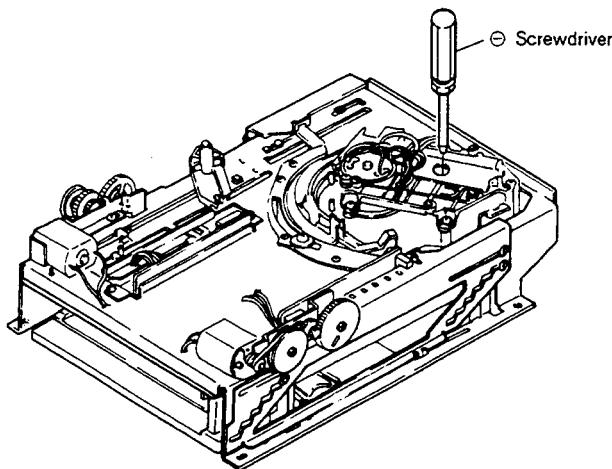


Fig. 7-2

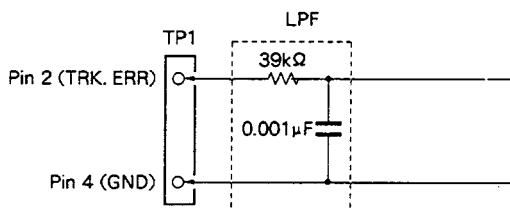


Fig. 7-3

0.5V/div	5msec /div	TP1 Pin 2 (TRK.ERR)	Grating	Null point
			Grating	Maximum amplitude

- Turn the  $\ominus$  screwdriver and find null point. (Photo. 7-1)
- Then, turn slowly the  $\ominus$  screwdriver counter clockwise from the null point and adjust at the point where the waveform (Tracking error signal) firstly becomes maximum amplitude. (See Photo. 7-2.)

## Note :

If the  $\ominus$  screwdriver is pressed strongly, the pickup moves toward disc center, accordingly adjustment becomes difficult.

- Finally, be sure to confirm that the tracking error signal (at this time, 4kHz of cutoff low-pass filter is not inserted) when the pickup is moved toward the disc center and the P-P voltage of the tracking error signal at the outer circumference of the disc are not varied greatly. When the level is deviated over  $\pm 10\%$ , adjust again by turning grating screw to the maximum error amplitude point.

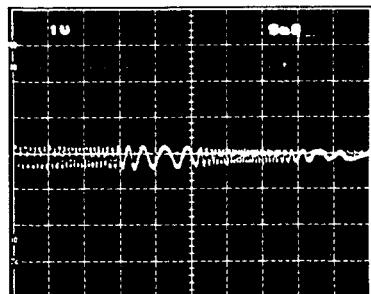


Photo 7-1  
Null point

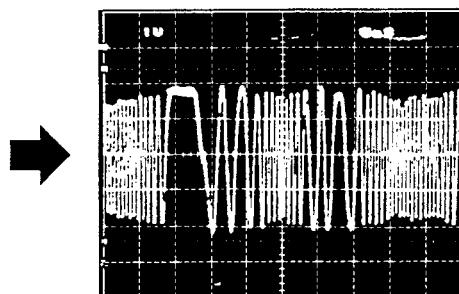


Photo 7-2  
Maximum amplitude

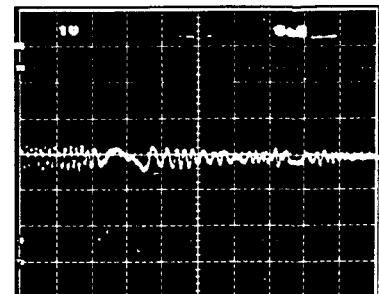
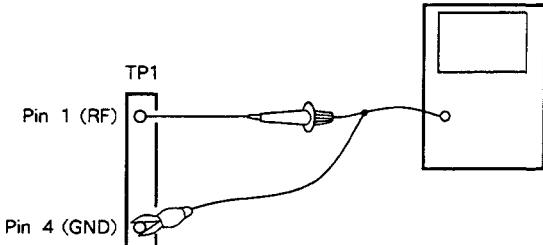
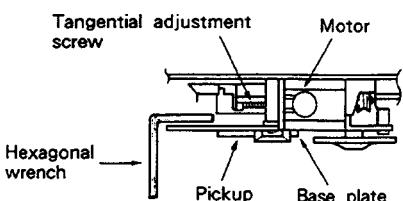


Photo 7-3  
This is not the null-point waveform.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
<b>6 TRACKING BALANCE ADJUSTMENT</b>						
	0.5V/div	5msec /div	TP1 Pin 2 (TRK. ERR)	VR5 (TRK. BAL)	(TRK. ERR)	<ul style="list-style-type: none"> <li>● Set the TEST disc.</li> <li>● Set to TEST mode. (See page 29.)</li> <li>● Shift the carriage close to the center of the disc by pressing MANUAL SEARCH FWD key (<math>\gg</math>).</li> <li>● Press TRACK FWD key (<math>\gg</math>), and PLAY key (<math>\triangleright</math>) to start turning the disc.</li> <li>● Observe pin 2 TRK. ERR (Tracking error) of TP1 with an oscilloscope and adjust with VR5 TRK. BAL (Tracking balance) volume so that the DC component of the tracking error disappears.</li> </ul> <p>Note : Before proceeding with the above adjustments, be sure to adjust the tracking error offset.</p>
<p>A ≠ B</p>						
<p>A = B</p>						
Photo. 7-4 DC component exists				Photo. 7-5 DC component not exist		

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
<b>7 TANGENTIAL ADJUSTMENT</b>						
	200nsec /div	TP1 Pin 1 (RF output)	Tangential adjustment screw	Best eye pattern	<ul style="list-style-type: none"> <li>● Set the TEST disc.</li> <li>● Set to TEST mode. (See page 29.)</li> <li>● Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷).</li> <li>● Press TRACK FWD key (▷▷), PLAY key (▷) and PAUSE key (  ) sequentially, and close all the servos. (Pause indicator lights up.)</li> <li>● Observe pin 1 RF (RF output) of TP1 with an oscilloscope and adjust with the tangential screw so that the eye pattern becomes clear. (Fig. 7-4 and 7-5)</li> <li>● The adjusting point is the middle point between the point where the eye pattern becomes deteriorate by turning the tangential screw clockwise and the point where the eye pattern becomes deteriorate by turning the tangential screw counterclockwise. As a criterion, observe that the overall waveform is clear and one of the diamond shapes within the eye pattern (Photo. 7-6), and adjust at as an optimum point where the diamond shape is seen relatively fine line.</li> </ul>	 <p>Fig. 7-4</p> <p>Note : During the adjustment, hold hexagonal wrench to upward so as to keep the pickup body not goes down.</p>



In the figure below, the top and bottom is opposite to that of the actual product.

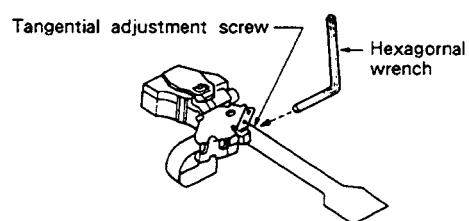


Fig. 7-5 Tangential adjustment

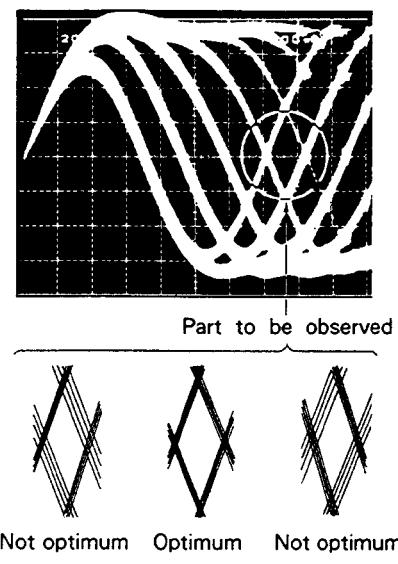


Photo 7-6

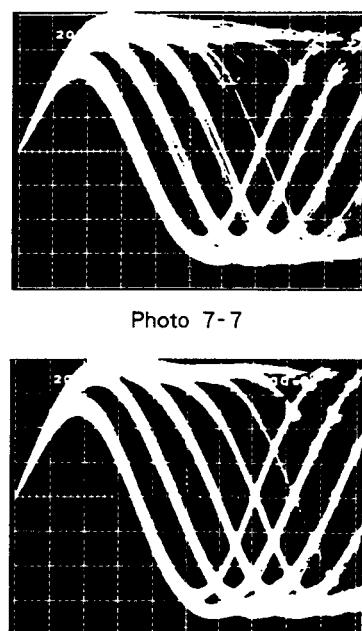


Photo 7-7

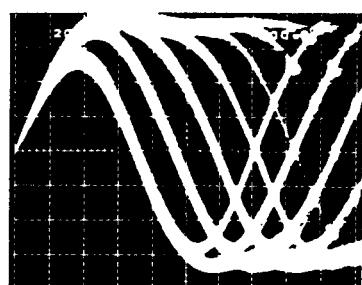


Photo 7-8

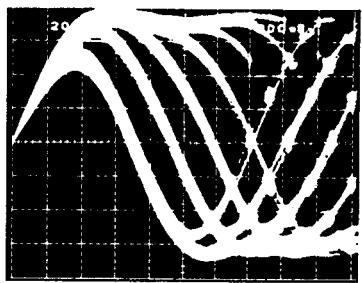


Photo 7-9

Step No.	Oscilloscope Setting V H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
<b>8 FOCUS GAIN ADJUSTMENT</b>					
	20mV/div, 5mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)	X axis: TP1 Pin 5 (FCS. IN) Y axis: TP1 Pin 6 (FCS. ERR)	VR3 (FCS. GAN)	Phase difference 90°	<ul style="list-style-type: none"> <li>In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 7-6.</li> <li>Set the unit to the normal PLAY mode.</li> <li>Turn the POWER of oscillator ON and output 1.2kHz 2Vp-p.</li> </ul> <p>Note : (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.)</p> <ul style="list-style-type: none"> <li>Adjust with VR3 FCS. GAN (Focus gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (Phase difference 90°).</li> </ul>

Fig. 7-6

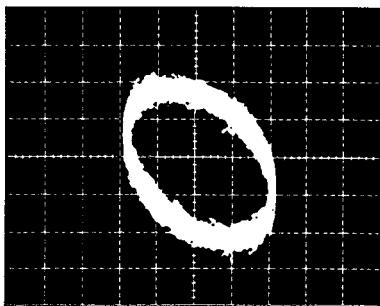


Photo. 7-10 High gain

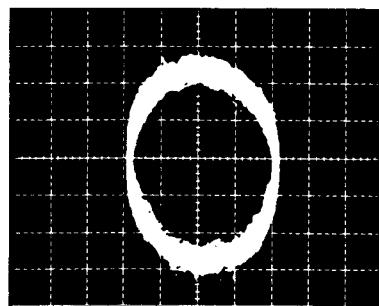


Photo. 7-11 Optimum gain

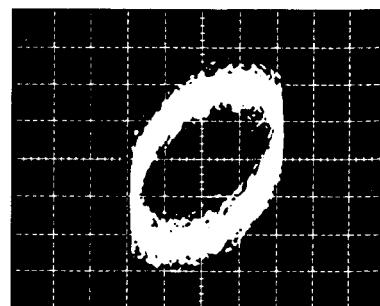


Photo. 7-12 Low gain

Step No.	Oscilloscope Setting	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure	
					V	H
<b>9 TRACKING GAIN ADJUSTMENT</b>						
	50mV/div, 5mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)	X axis : TP1 Pin 3 (TRK. IN) Y axis : TP1 Pin 2 (TRK. ERR)	VR4 (TRK. GAN)	Phase difference 90°	<ul style="list-style-type: none"> <li>In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 7-7.</li> <li>Set the unit to the normal PLAY mode.</li> <li>Turn the POWER of oscillator ON and output 1.2kHz 2Vp-p.</li> </ul> <p>Note : (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.)</p> <ul style="list-style-type: none"> <li>Adjust with VR4 TRK. GAN (Tracking gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (phase difference 90°).</li> </ul>	

Fig. 7-7

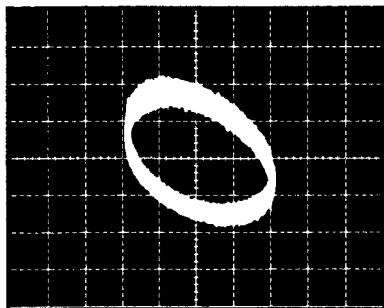


Photo. 7-13 High gain

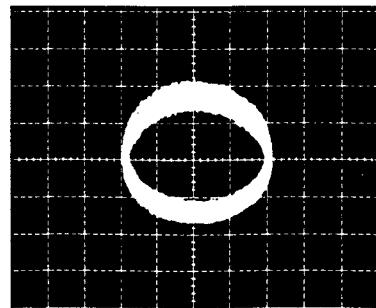


Photo. 7-14 Optimum gain

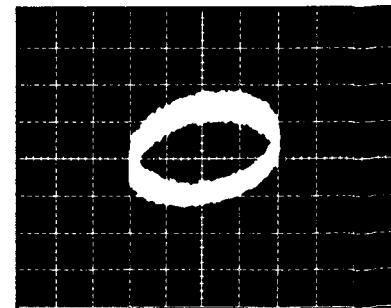


Photo. 7-15 Low gain

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
10	<b>VCO FREE RUN FREQUENCY ADJUSTMENT</b>					
			TP2 Pin 2 (PLCK)	VR8 (VCO. ADJ)	4.275 ± 0.025MHz	<ul style="list-style-type: none"> <li>● Set to TEST mode. (See page 29.)</li> <li>● Short-circuit between ASY and GND jumper with Θ screwdriver, etc. (Fig. 7-1)</li> <li>● Connect frequency counter, which is measurable over 10MHz, to pin 2 of TP2 (PLCK).</li> <li>● Adjust with VR8 VCO. ADJ (VCO adjustment) volume so that the value of frequency counter becomes 4.275 ± 0.025MHz.</li> </ul>
11	<b>METHOD TO CONFIRM S CHARACTER (FOCUS ERROR)</b>					
			TP1 Pin 6 (FCS. ERR)			<ul style="list-style-type: none"> <li>● Set to TEST mode. (See page 29)</li> <li>● Short-circuit between pin 5 FCS. IN (Focus in) of TP1 and GND.</li> <li>● Press TRACK FWD key (▷▷  ) and observe the waveform of pin 6 FCS. ERR (Focus error) of TP1 at that time with an oscilloscope.</li> </ul>

## 7. RÉGLAGES

Les réglages pour ce modèle doivent être réalisés dans l'ordre indiqué ci-dessous.

### • Réglages et vérifications à effectuer

1. Réglages de l'offset de centrage de piste, de l'offset de focalisation et de l'offset RF.
2. Réglage du niveau RF
3. Vérification de la puissance de sortie de la diode laser (LD)
4. Vérification du verrouillage de focalisation et du verrouillage de moyeu
5. Réglage du réseau
6. Réglage de l'équilibrage de centrage de piste
7. Réglage tangentiel
8. Réglage du gain de focalisation
9. Réglage du gain de centrage de piste
10. Réglage de la fréquence propre du VCO
11. Méthode de contrôle de la caractéristique S (erreur de focalisation)

### • Matériel de mesure

1. Oscilloscope double trace
2. Appareil de mesure pour puissance laser
3. Disque d'essai (YEDS - 7)
4. Filtre de réglage pour équilibrage de centrage de piste
5. Filtre de réglage pour gain de boucle
6. Générateur de signal
7. Fréquencemètre
8. Outilage général divers

### • Mode d'essai

#### Méthodes de réglage et d'annulation du mode d'essai

- (1) Pour régler le mode d'essai, placer l'interrupteur d'alimentation (POWER) du lecteur (S401) sur la position de marche (ON) en appuyant sur l'interrupteur de mode d'essai (TEST MODE SWITCH) (S1).
- (2) Pour annuler le mode d'essai, amener simplement l'interrupteur d'alimentation (POWER) du lecteur sur la position d'arrêt (OFF).

Les différentes fonctions des touches dans le mode d'essai sont indiquées dans le tableau 7-1.

### • Dispositifs d'ajustement et nomenclature

VR1 : Puissance laser  
 VR2 : Offset RF (RF.OFS)  
 VR3 : Gain de focalisation (FCS.GAN)  
 VR4 : Gain de centrage de piste (TRK.GAN)  
 VR5 : Equilibrage de centrage de piste (TRK.BAL)  
 VR6 : Décalage de focalisation (FCS.OFS)  
 VR7 : Décalage de centrage de piste (TRK.OFS)  
 VR8 : Réglage du VCO (VCO.ADJ)

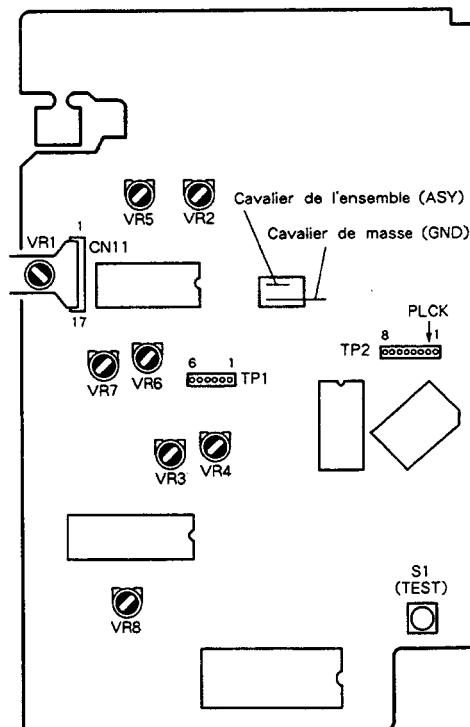
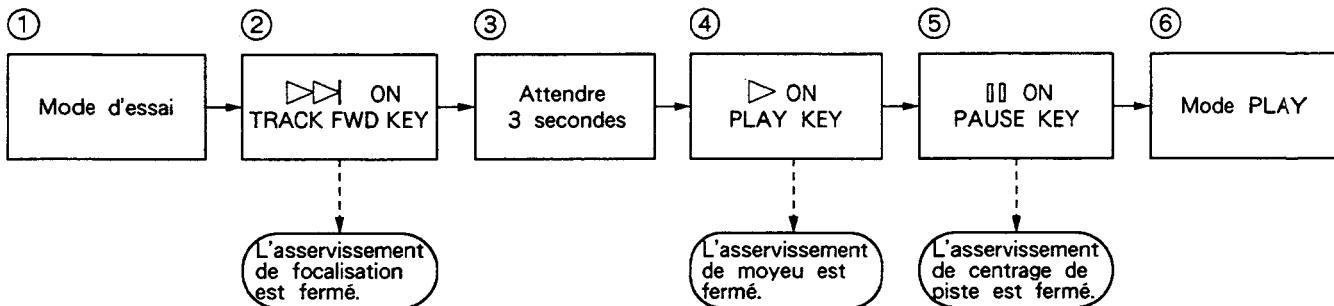


Fig. 7-1 Point de réglage

Dans le mode d'essai (Test Mode), chaque circuit asservi peut être fermé ou ouvert au moyen d'opérations séparées. En conséquence, les asservissemens doivent être fermés l'un après l'autre (séquentiellement) pour régler le mode de lecture (PLAY).

Note : Le mode de lecture (PLAY) n'est pas simplement mis en oeuvre par l'enfoncement de la touche PAUSE (II) dans le mode d'essai.



### • Fonction des touches dans le mode d'essai (Test Mode)

Symbol	Désignation de touche	Fonction pendant le mode d'essai	Description
>>	TRACK FWD	Asservissement de focalisation fermé.	La diode laser s'allume. Le moteur d'asservissement se déplace vers le haut/bas, puis l'asservissement de focalisation est fermé.
>	PLAY	Asservissement de moyeu fermé.	Le moyeu commence à tourner et l'asservissement est fermé lorsqu'il passe dans le mode CLV-A.
II	PAUSE	Asservissement de centrage de piste ouvert/fermé	Réalise l'opération de bascule. Fermeture de l'asservissement de centrage de piste et passage en mode de lecture (PLAY) en appuyant sur la touche (l'asservissement de focalisation et l'asservissement de moyeu doivent de fermer); le voyant de PAUSE s'allume. L'asservissement de centrage de piste s'ouvre par une nouvelle pression sur la touche.
<<	MANUAL SEARCH REV	Le chariot se déplace en arrière (vers le centre du disque).	Le chariot se déplace vers le centre du disque à une vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
>>	MANUAL SEARCH FWD	Le chariot se déplace en avant (vers le centre du disque).	Le chariot se déplace vers la fin du disque à la vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
□	STOP	Arrêt	Tous les asservissements sont ouverts.
△	EJECT	Ejection du magasin de claque compact	Le magasin du disque compact est éjecté. Néanmoins, la tête de lecture ne revient pas sur sa position de repos. De plus, même lorsque le disque est enfermé, la tête de lecture demeure tel quel.

Tableau 7-1

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Methode de réglage
	V	H				
<b>1</b>	<b>RÉGLAGES DE L'OFFSET DE CENTRAGE DE PISTE, DE L'OFFSET DE FOCALISATION ET DE L'OFFSET RF</b>					
			TP1 Broche 2 (TRK. ERR)	VR5 (TRK. BAL)  TP1 Broche 6 (FCS. ERR)	Offset de centrage de piste 45°  0V ± 50mV	<ul style="list-style-type: none"> <li>• Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>• Tourner le potentiomètre VR5 TRK. BAL (équilibrage de centrage de piste) de 45° depuis le centre dans le sens des aiguilles d'une montre.</li> <li>• Ajuster le potentiomètre VR7 TRK. OFS (décalage de centrage de piste) de façon à ce que la tension à la broche 2 TRK. ERR (erreur de centrage de piste) de TP1 devienne égale à 0 V ± 50 mV.</li> <li>• Régler VR6 FCS. OFS (offset de focalisation) de manière à ce que la tension de FCS. ERR (erreur de focalisation) relevée sur la broche 6 de TP1 soit de 0 V ± 50 mV.</li> <li>• Régler VR2 RF. OFS (offset RF) de manière à ce que la tension de RF OUTPUT (sortie RF) relevée sur la broche 1 de TP1 soit de 100 mV ± 50 mV.</li> </ul>
<b>2</b>	<b>RÉGLAGE DU NIVEAU RF</b>					
			TP1 Broche 1 (RF)	VR1 Puissance laser	1,5 Vc-c + 0,2V - 0V	<ul style="list-style-type: none"> <li>• Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>• Reproduire le disque d'essai (TEST) et raccorder la sonde d'un oscilloscope à la broche 1 RF (sortie RF) de TP1 et mesurer la tension C-C de la forme d'onde RF.</li> <li>• Régler VR1 (puissance laser) de façon que la tension soit de 1,5 Vc-c + 0,2V - 0V.</li> </ul>
<b>3</b>	<b>VÉRIFICATION DE LA PUISSEANCE DE SORTIE DE LA DIODE LASER (LD)</b>					
				Confirmation : moins de 0,13mW		<ul style="list-style-type: none"> <li>• Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>• Appuyer sur la touche de centrage de piste arrière (TRACK FWD) (<math>\triangleright\triangleright\downarrow</math>) et enclencher la diode laser (LD).</li> <li>• Placer la capteur de l'instrument destiné à mesurer la puissance laser au dessus de l'objectif et vérifier que la puissance de sortie de la diode laser (LD) est inférieure à 0,13 mW.</li> </ul>
<b>4</b>	<b>VÉRIFICATION DU VERROUILLAGE DE FOCALISATION ET DU VERROUILLAGE DE MOYEU</b>					
	0,5V/div	100msec / div	TP1 Broche 1 (Sortie RF)		Présence de sortie RF  Rotation normale	<ul style="list-style-type: none"> <li>• Mettre en place le disque d'essai (TEST).</li> <li>• Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>• Déplacer la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche (MANUAL SEARCH FWD (<math>\triangleright\triangleright</math>)). * Cette étape doit absolument être réalisée.</li> <li>• Observer le signal RF à la broche 1 de TP 1 (sortie RF) au moyen d'un oscilloscope et vérifier que le signal RF sorte après l'enfoncement de la touche d'avance de piste TRACK FWD (<math>\triangleright\triangleright\downarrow</math>).</li> <li>• Appuyer sur la touche de lecture (PLAY) (<math>\triangleright</math>) et s'assurer que le disque tourne en sens normal avec approximativement la vitesse spécifiée (étant près du centre du disque, la vitesse de rotation est d'environ 300 tr/mn), sans anomalie ni inversion du sens de rotation.</li> </ul>



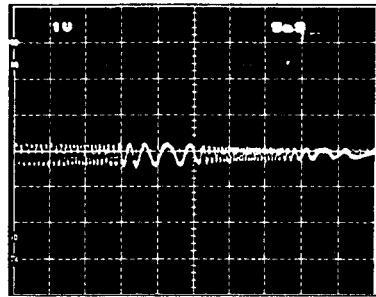


Photo 7-1  
Point zéro

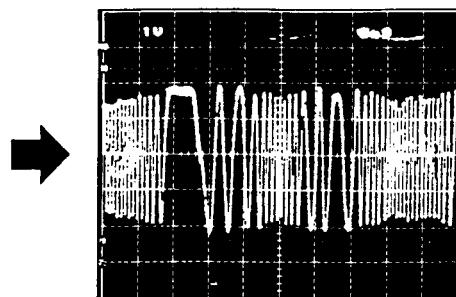


Photo 7-2  
Amplitude maximum

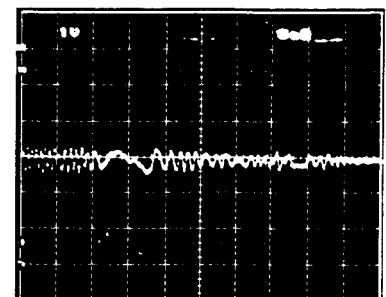


Photo 7-3  
Forme d'onde hors du point zéro

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
	V	H				
<b>6 RÉGLAGE DE L'EQUILIBRAGE DE CENTRAGE DE PISTE</b>						
	0.5V/div	5msec / div	TP1 Broche 2 (TRK. ERR)	VR5 (TRK. BAL)	TRK. ERR	<ul style="list-style-type: none"> <li>Mettre en place le disque d'essai (TEST).</li> <li>Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (<math>\gg</math>).</li> <li>Appuyer sur la touche de piste avant (TRACK FWD) (<math>\gg\mid</math>) et sur la touche de lecture (PLAY) (<math>\triangleright</math>) pour faire tourner le disque.</li> <li>Observer la broche 2 TRK. ERR (erreur de centrage de piste) de TP1 au moyen d'un oscilloscope et ajuster au moyen de potentiomètre VR5 TRK. BAL (équilibrage de centrage de piste) de façon à ce que la composante continue de l'erreur de centrage de piste disparaîsse.</li> </ul> <p>Note : Avant de procéder aux ajustements ci-dessus, veiller à régler le décalage d'erreur de piste.</p>
<p>A ≠ B</p>						
<p>A = B</p>						
Photo. 7-4 Présence de la composante continue				Photo. 7-5 Absence de la composante continue		

Pas No.	Réglage de l'oscilloscope		Points d'essai	Pointe de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
	V	H				
7	<b>RÉGLAGE TANGENTIEL</b>					
	200nsec / div	TP1 Broche 1 (sortie RF)	Vis de réglage tangentiel	Mire Best Eye		<ul style="list-style-type: none"> <li>● Mettre en place le disque d'essai (TEST)</li> <li>● Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>● Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (<math>\triangleright\triangleright</math>).</li> <li>● Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) (<math>\triangleright\triangleright!</math>), de lecture (PLAY) (<math>\triangleright</math>) et de pause (PAUSE) (<math>\ \ </math>), et fermer tous les asservissements. (Le voyant de pause s'allume.)</li> <li>● Observer le signal RF à la broche 1 (sortie RF) de TP1 au moyen d'un oscilloscope et régler au moyen de la vis tangentielle, de façon à ce que la mire Best Eye devienne claire. (Figure 7-4 et 7-5)</li> <li>● Le point de réglage se situe au milieu entre le point où la mire se détériore en tournant la vis tangentielle dans le sens des aiguilles d'une montre et le point où la mire se détériore en tournant la vis tangentielle dans le sens inverse des aiguilles d'une montre. Comme critère, observer que la forme d'onde globale soit claire et que l'une des formes de losange se situe dans la mire (Photo 7-6) ; réaliser le réglage en un point optimum où la forme de losange apparaît avec des traits relativement fins.</li> </ul>

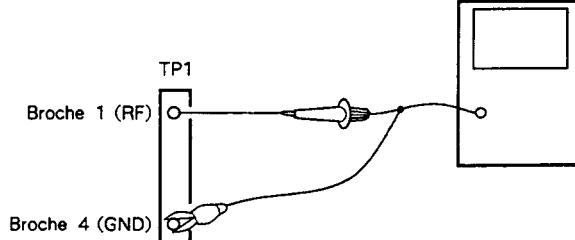
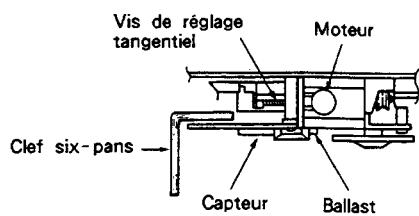


Fig. 7-4

Note : Pendant le réglage, tenir la clef six-pans vers le haut de façon à ce que le corps de la tête de lecture ne descende pas.



Dans l'illustration ci-dessous, le dessus et le dessous de l'appareil sont en réalité à l'envers.

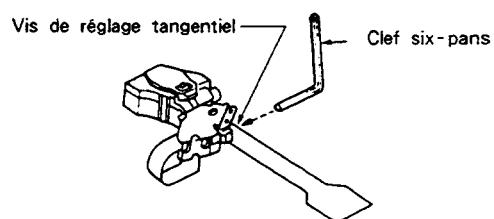
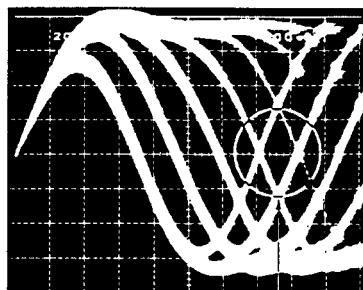
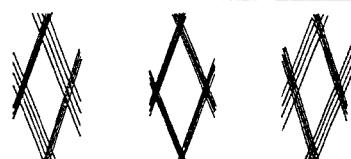


Fig. 7-5 Réglage tangentiel



Concentre sur la netteté du losange



Insatisfaisant      Optimal      Insatisfaisant

Photo 7-6

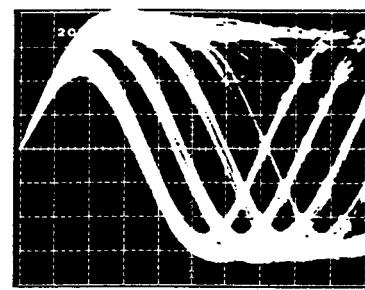


Photo 7-7

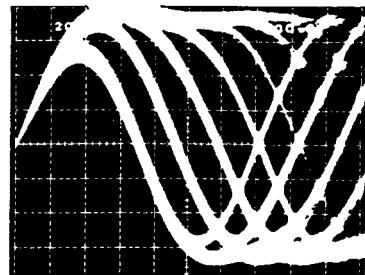


Photo 7-8

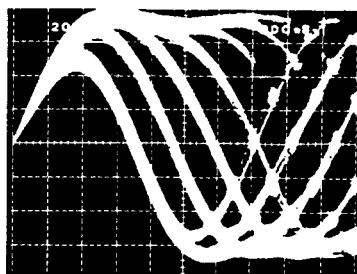


Photo 7-9

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
	V	H				
<b>8 RÉGLAGE DU GAIN DE FOCALISATION</b>						
	20mV/div. 5mV/div. Canal 1 (X), Canal 2 (Y) (Sonde 10:1)	Axe X : TP1 Broche 5 (FCS. IN) Axe Y : TP1 Broche 6 (FCS. ERR)	VR3 (FCS. GAN)	Différence de phase 90°	<ul style="list-style-type: none"> <li>L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 7-6.</li> <li>Régler l'appareil en mode de lecture normale.</li> <li>Enclencher l'alimentation de l'oscillateur et délivrer un signal de 1,2 kHz à 2 Vc-c.</li> </ul> <p>Note : (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.)</p> <ul style="list-style-type: none"> <li>Ajuster le potentiomètre VR3 FCS.GAN (gain de focalisation) de façon à ce que la figure de Lissajou observée sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).</li> </ul>	

Fig. 7-6

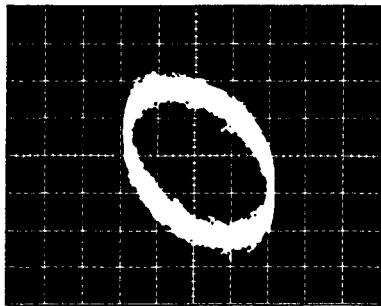


Photo. 7-10 Gain élevé

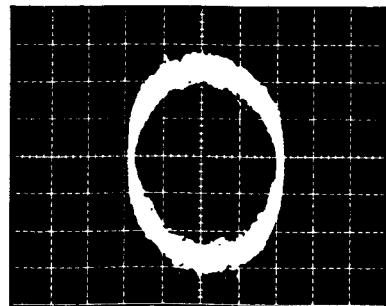


Photo. 7-11 Gain optimum

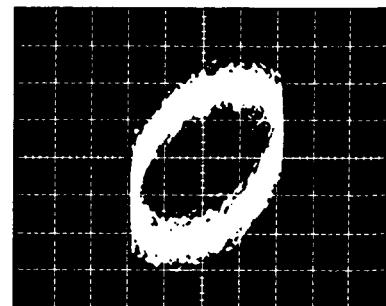


Photo. 7-12 Gain réduit

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
	V	H				
<b>9 RÉGLAGE DU GAIN DE CENTRAGE DE PISTE</b>						
	50mV/div, 5mV/div. Canal 1 (X), Canal 2 (Y) (Sonde 10:1)	Axe X : TP1 Broche 3 (TRK. IN) Axe Y : TP1 Broche 2 (TRK. ERR)	VR4 (TRK.GAN)	Déphasage 90°		<ul style="list-style-type: none"> <li>• L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 7-7.</li> <li>• Réglér l'appareil en mode de lecture normale.</li> <li>• Enclencher l'alimentation de l'oscillateur et fournir un signal de 1,2 kHz à 2 Vc-c.</li> </ul> <p>Note : (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.)</p> <ul style="list-style-type: none"> <li>• Ajuster le potentiomètre VR4 TRK.GAN (gain de centrage de piste) de façon à ce que la figure de Lissajou sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).</li> </ul>

Fig. 7-7

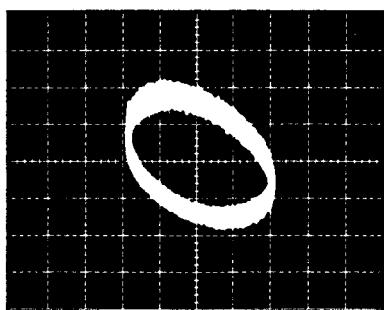


Photo. 7-13 Gain élevé

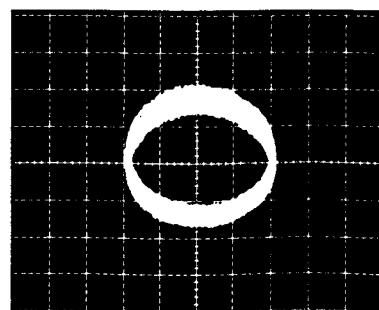


Photo. 7-14 Gain optimum

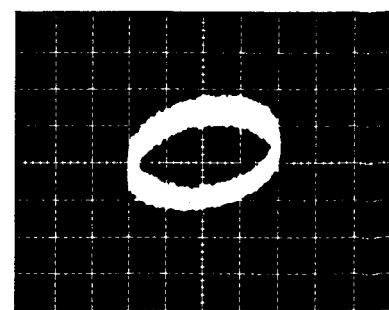


Photo. 7-15 Gain réduit

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
	V	H				
<b>10</b>	<b>RÉGLAGE DE LA FRÉQUENCE PROPRE DU VCO</b>					<ul style="list-style-type: none"> <li>● Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>● Court-circuiter entre les ponts ASY et GND un <math>\ominus</math> tournevis, etc. (Figure 7-1)</li> <li>● Reccorder un fréquencemètre capable de mesurer audessus de 10 MHz à la broche 2 de TP2 (PLCK).</li> <li>● Ajuster le potentiomètre VR8 VCO ADJ (réglage du VCO) de façon à ce que la valeur indiquée par le fréquencemètre devienne égale à <math>4,275 \pm 0,025\text{MHz}</math>.</li> </ul>
<b>11</b>	<b>MÉTHODE DE CONTRÔLE DE LA CARACTÉRISTIQUE S (ERREUR DE FOCALISATION)</b>					<ul style="list-style-type: none"> <li>● Régler le mode d'essai (TEST). (Voir page 39.)</li> <li>● Réaliser un court-circuit entre la broche 5 FCS.IN (entrée de focalisation) de TP1 et la terre GND.</li> <li>● Appuyer sur la touche d'avance de piste (TRACK FWD) (<math>\triangleright\triangleright\triangleright</math>) et observer simultanément la forme d'onde à la broche 6 FCS.ERR (erreur de focalisation) de TP1 au moyen d'un oscilloscope.</li> </ul>

## 7. AJUSTE

Los ítems de ajuste de este modelo deberán ser efectuados en el orden mostrado abajo.

### • Ítems de ajuste y comprobación

1. Ajuste de desviación de seguimiento, foco y RF.
2. Ajuste del nivel de RF
3. Confirmación de la alimentación de salida de LD (diodo láser)
4. Confirmación de enclavamiento del enfoque y del eje
5. Ajuste del retículo
6. Ajuste del equilibrio de seguimiento
7. Ajuste tangencial
8. Ajuste de la ganancia de enfoque
9. Ajuste de la ganancia de seguimiento
10. Ajuste de la frecuencia propia de VCO
11. Método para confirmar el carácter S (error de enfoque)

### • Equipo de medición

1. Osciloscopio de doble traza
2. Medidor de alimentación del láser
3. Disco de prueba (YEDS-7)
4. Filtro de ajuste de equilibrio de seguimiento
5. Filtro de ajuste de ganancia de bucle
6. Generador de señal
7. Contador de frecuencia
8. Otras herramientas generales

### • Modo de prueba

#### Ajuste del modo de prueba y los procedimientos de cancelación

- (1) Para disponer el modo de prueba, coloque en ON el interruptor POWER del reproductor (S401) mientras presiona el interruptor TEST MODE (S1). (terminales del modo de ajuste).
- (2) Para cancelar el modo de prueba, simplemente gire el interruptor de POWER del reproductor a OFF.

Las varias funciones de tecla en el modo de prueba están enlistadas en la Tabla 7-1.

### • Tores variables (VR) de ajuste y sus nombres

- VR1 : Alimentación del láser
- VR2 : Compensación de RF (RF.OFS)
- VR3 : Ganancia de enfoque (FCS.GAN)
- VR4 : Ganancia de seguimiento (TRK.GAN)
- VR5 : Equilibrio de seguimiento (TRK.BAL)
- VR6 : Desviación de enfoque (FCS.OFS)
- VR7 : Desviación del seguimiento (TRK.OFS)
- VR8 : Ajuste de VCO (VCO.ADJ)

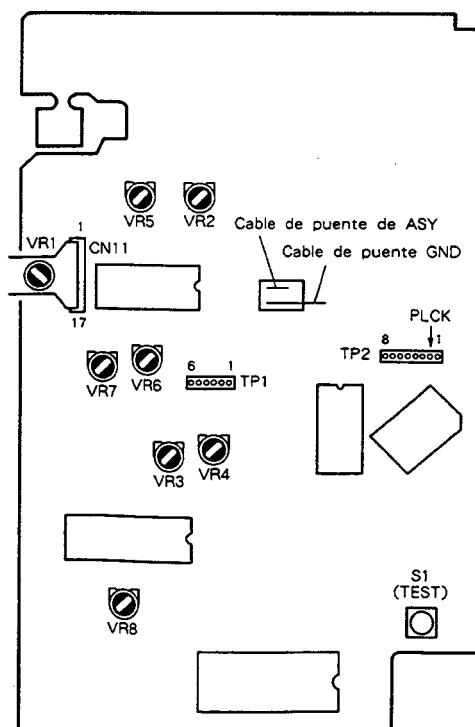
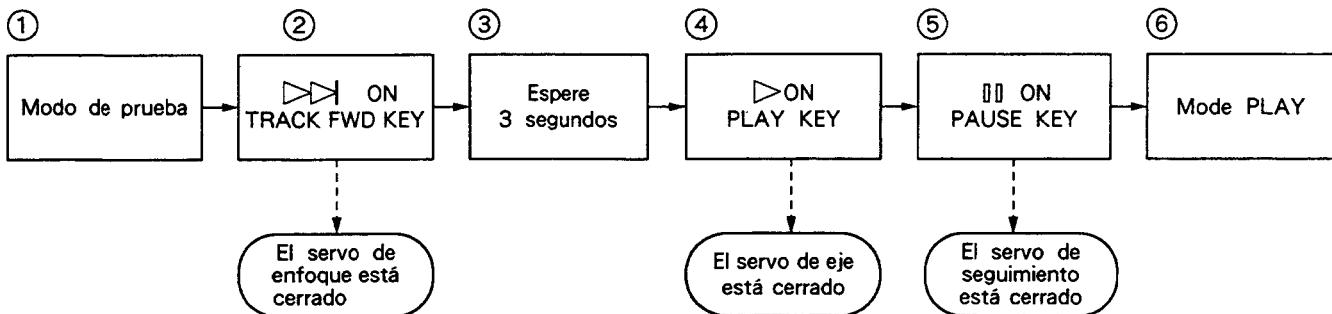


Fig. 7-1 Punto de ajuste

En el modo de prueba, cada servocircuito puede ser cerrado y abierto por operaciones separadas. Consecuentemente, cada servo deberá ser cerrado uno a la vez (en secuencia en serie) para ajustar el modo de PLAY (reproducción).

Fíjese que el modo de PLAY no se activa simplemente presionando la tecla de PAUSE (pausa) (II) en el modo de prueba.

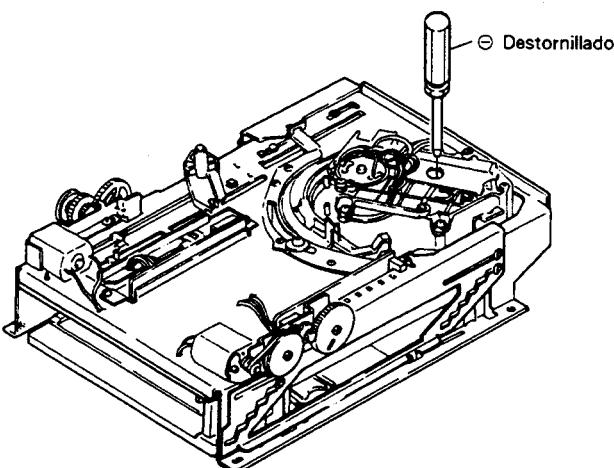
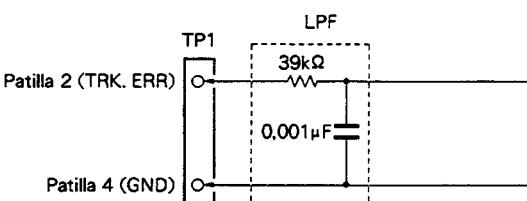


### • Funciones de tecla en el modo de prueba

Símbolo	Nombre de tecla	Función durante el modo de prueba	Descripción
▶	TRACK FWD	El servo de enfoque está cerrado.	El diodo láser se enciende. El actuador se mueve arriba / abajo, luego se cierra el servo de enfoque.
▷	PLAY	El servo de eje está cerrado.	El eje comienza a rotar y se cierra el servo cuando se convierte en el modo de servo CLV-A.
II	PAUSE	El servo de seguimiento está cerrado/abierto	Ejecuta la operación de conexión oscilante. Cuando se cierra el servo de seguimiento y se pone en el modo de PLAY presionando esta tecla (el servo de enfoque y el del eje deberán estar cerrados), y el indicador de pausa se enciende. El servo de seguimiento se abre presionando de nuevo la tecla.
<<	MANUAL SEARCH REV	El carro se mueve en la dirección inversa (hacia el centro del disco)	El carro se mueve hacia el centro del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
>>	MANUAL SEARCH FWD	El carro se mueve en la dirección hacia delante. (hacia el final del disco)	El carro se mueve hacia el final del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
□	STOP	PARADO	Todos los servos están abiertos.
△	EJECT	(Cargador de discos compactos)	El cargador de discos compactos. Sin embargo, el captador no regresa a su posición de aparcamiento. Además, aun cuando se cierra el disco el captador permanece tal como está.

Tabla 7-1

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
<b>1 AJUSTES DE COMPENSATION DE SEGUIMIENTO, FOCO Y RF</b>						
			Patilla 2 de TP1 (TRK. ERR) Patilla 6 de TP1 (FCS. ERR) Patilla 1 de TP1 (RF OUTPUT)	VR5 (TRK. BAL) VR7 (TRK. OFS) VR6 (FCS. OFS) VR2 (RF. OFS)	Desviación de seguimiento 45é 0V ± 50mV Compens. de foco 0V ± 50mV Compens. de RF 100mV ± 50mV	<ul style="list-style-type: none"> <li>Ajuste el modo de TEST. (Vea la página 49.)</li> <li>Gire el volumen de TRK.BAL (Equilibrio de seguimiento) de VR5 en el sentido de las manecillas del reloj 45° del centro.</li> <li>Ajuste VR7 TRK.OFS (de seguimiento) de modo que el voltaje en TRK.ERR (desviación de seguimiento) de la patilla 2 de TP1 se ponga en 0V ± 50 mV.</li> <li>Ajuste VR6 FCS.OFS (compensación de foco) de modo que el voltaje de FCS.ERR (error de foco) en la patilla 6 de TP1 sea 0V ± 50mV.</li> <li>Ajuste VR2 RF.OFS (compensación de RF) de modo que el voltaje de salida de RF en la patilla 1 de TP1 sea 100 mV ± 50 mV.</li> </ul>
<b>2 AJUSTE DEL NIVEL DE RF</b>						
			Patilla 1 de TP1 (RF)	Alimentación del laser VR1	1,5Vp-p +0,2V -0V	<ul style="list-style-type: none"> <li>Ajuste el modo de TEST. (Vea la página 49.)</li> <li>Reproduzca el disco de TEST y conecte la sonda de un osciloscopio a la RF de la patilla 1 (Salida de RF) de TP1 y mida el voltaje de P-P de la forma de onda de RF.</li> <li>Ajuste VR1 (alimentación del láser) que el valor sea 1,5Vp-p +0,2V -0V.</li> </ul>
<b>3 CONFIRMACION DE ALIMENTACION DE ALIDA DE LD (DIODO LASER)</b>						
					Confirmación Menos de 0,13mW	<ul style="list-style-type: none"> <li>Ajuste el modo de TEST. (Vea la página 49.)</li> <li>Presione la tecla de TRACK FWD (▷▷) y encienda el LD (Diodo láser).</li> <li>Ubique el sensor del medidor de potencia del láser inmediatamente arriba del objetivo, y confirme que la potencia de salida del LD sea menos de 0,13 mW.</li> </ul>
<b>4 CONFIRMACION DE BLOQUEO DE ENFOQUE Y DEL EJE</b>						
	0,5V/div	100mseg /div	Patilla 1 de TP1 (Salida de RF)		Existe salida de RF Rotación normal	<ul style="list-style-type: none"> <li>Ajuste del disco de TEST.</li> <li>Ajuste del modo de TEST. (Vea la página 49.)</li> <li>Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷). * Tenga en cuenta que este paso deberá ser ejecutado.</li> <li>Observe RF (Radio frecuencia) de la patilla 1 de TP1 con un osciloscopio y confirme que se saque la señal de RF después de presionar la tecla de TRACK.ERR (▷▷).</li> <li>Presione la tecla de PLAY (▷) y asegúrese que el disco rota en la dirección normal casi a la velocidad especificada (tal como está cerca del centro del disco, la velocidad de rotación es alrededor de 300 rpm) y que no rote anormalmente o inversamente.</li> </ul>

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste												
	V	H																
5	<b>AJUSTE DE LA MIRA</b>																	
						<ul style="list-style-type: none"> <li>● Ajuste el modo TEST. (Vea la página 49.)</li> <li>● Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (<math>\gg</math>) de modo que el tornillo de ajuste de retículo del captador pueda ser visto a través del orificio oval en el lado superior del servomecanismo.</li> <li>● Inserte un <math>\ominus</math> destornillador en el orificio del lado superior del mecanismo como se muestra en la Fig. 7-2, y confirme que gira el tornillo de retículo.</li> <li>● Presione la tecla de TRACK FWD (<math>\gg</math>) y la tecla de PLAY (<math>\gg</math>) secuencialmente y cierre el servo de enfoque y el del eje. (No cierre el servo de seguimiento.)</li> <li>● Observe la forma de onda en TRK.ERR (Error de seguimiento) de la patilla 2 de TP1 con un osciloscopio. Luego inserte un filtro de paso bajo de corte. (Fig. 7-3)</li> </ul>  <p>Fig. 7-2</p>  <p>Fig. 7-3</p> <table border="1"> <tr> <td>0.5V/div</td> <td>5mseg /div</td> <td>Patilla 2 de TP1 (TRK. ERR)</td> <td>Reticulo</td> <td>Punto cero</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Patilla 2 de TP1 (TRK. ERR)</td> <td>Reticulo</td> <td>Amplitud máxima</td> </tr> </table>	0.5V/div	5mseg /div	Patilla 2 de TP1 (TRK. ERR)	Reticulo	Punto cero					Patilla 2 de TP1 (TRK. ERR)	Reticulo	Amplitud máxima
0.5V/div	5mseg /div	Patilla 2 de TP1 (TRK. ERR)	Reticulo	Punto cero														
			Patilla 2 de TP1 (TRK. ERR)	Reticulo	Amplitud máxima													

- Gire el  $\ominus$  destornillador y encuentre el punto cero. (Foto. 7-1)
- Luego, gire lentamente el  $\ominus$  destornillador hacia el sentido contrario del reloj desde el punto cero y ajuste en el punto donde la forma de onda (Señal de error de seguimiento) primeramente se ponga a una amplitud máxima. (Vea Foto. 7-3)

## Nota :

Si el  $\ominus$  destornillador se presiona fuertemente, el captador se mueve hacia el centro del disco, por consiguiente el ajuste resulta difícil.

- Finalmente, asegúrese de confirmar que la señal de error de seguimiento (en este momento, no se ha insertado el filtro de paso bajo de corte de 4 kHz) cuando el captador se mueve hacia el centro del disco y el voltaje de P-P de la señal de error de seguimiento en la circunferencia exterior del disco no haya variado considerablemente. Cuando se desvía el nival arriba de  $\pm 10\%$ , ajuste de nuevo girando el tornillo de retículo a un punto de amplitud de error mínimo.

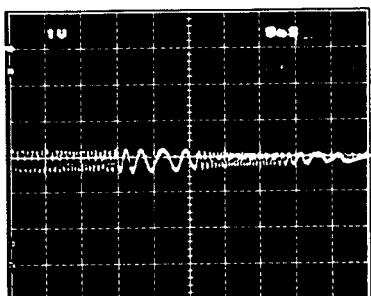


Foto 7-1  
Punto cero

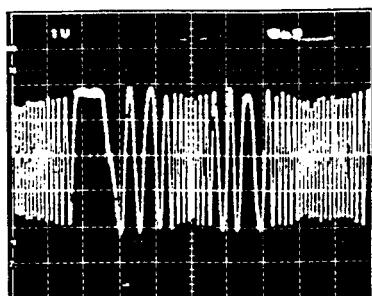


Foto 7-2  
Amplitud máxima

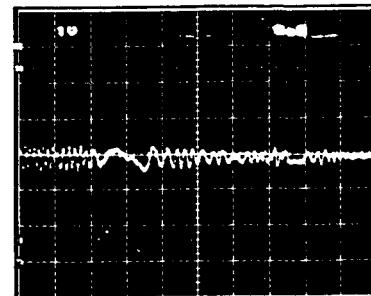


Foto 7-3  
Forma de onda de un punto no cero

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
<b>6 AJUSTE DE EQUILIBRIO DE SEGUIMIENTO</b>						
	0.5V/div	5mseg /div	Patilla 2 de TP1 (TRK. ERR)	VR5 (TRK. BAL)	TRK. ERR	<ul style="list-style-type: none"> <li>● Ajuste el disco de TEST.</li> <li>● Ajuste el modo de TEST. (Vea la página 49.)</li> <li>● Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷).</li> <li>● Presione la tecla de TRACK FWD (▷▷) y la tecla de PLAY (▷) para comenzar a voltear el disco.</li> <li>● Observe TRK. ERR (Error de seguimiento) de la patilla 2 de TP1 con un osciloscopio y ajuste con el volumen de TRK. BAL (Equilibrio de seguimiento) de VR5 de modo que la componente de CC del error de seguimiento desaparezca.</li> </ul> <p>Nota : Antes de realizar los ajustes indicados arriba, asegúrese de compensar el error de seguimiento.</p>
<p>A ≠ B</p>						
<p>A = B</p>						
Foto. 7-4 Existe componente de CC				Foto. 7-5 No existe componente de CC		

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
7	<b>AJUSTE TANGENCIAL</b>					
	200nseg /div	Patilla 1 de TP1 (Salida de RF)	Tornillo de ajuste de la tangencial	Mejor imagen de prueba		<ul style="list-style-type: none"> <li>● Ajuste el disco de TEST.</li> <li>● Ajuste el modo de TEST. (Vea la página 49.)</li> <li>● Cambie el carro cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷).</li> <li>● Presione la tecla de TRAK FWD (▷▷), la tecla de PLAY (▷) y la tecla de PAUSE (  ) secuencialmente, y cierre todos los servos. (El indicador de pausa se enciende.)</li> <li>● Observe el RF de la patilla 1 (Salida de RF) de TP1 con un osciloscopio y ajuste con el tornillo de la tangencial de modo que la imagen de prueba resulte nítida. (Fig. 7-4 y 7-5)</li> <li>● El punto de ajuste es el punto medio entre el punto donde la imagen de prueba se deteriora girando el tornillo de la tangencial en el sentido de las manecillas del reloj, y el punto donde la imagen de prueba se deteriora girando el tornillo de la tangencial en contra del sentido de las manecillas del reloj. Como un criterio, observe que la forma de onda en conjunto sea nítida y que una de las figuras de diamante esté dentro de la imagen de prueba (Foto. 7-6), y ajuste al punto óptimo donde la forma de diamante se vea relativamente como una línea fina.</li> </ul>

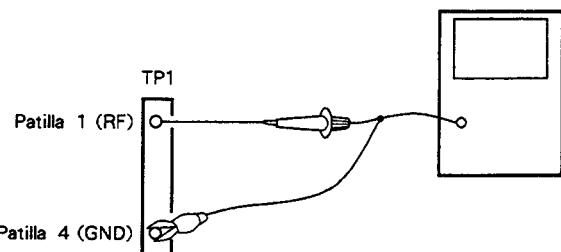
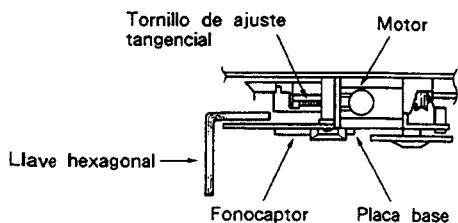


Fig. 7-4

(Nota) Durante el ajuste, sostenga la llave hexagonal hacia arriba para evitar que el cuerpo del captador vaya hacia abajo.



En la figura siguiente, las partes superior e inferior son opuestas a las del producto real.

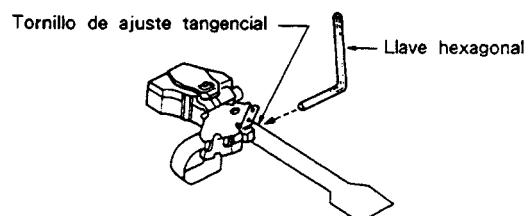


Fig. 7-5 Ajuste tangencial

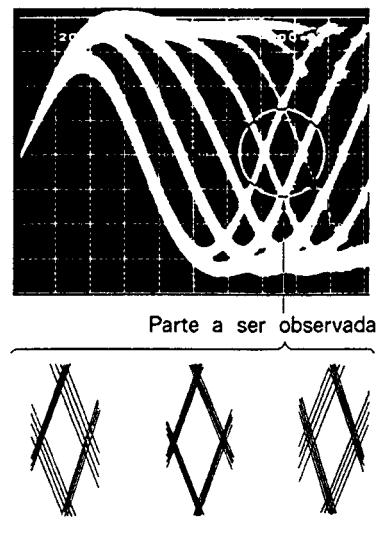


Foto 7-6

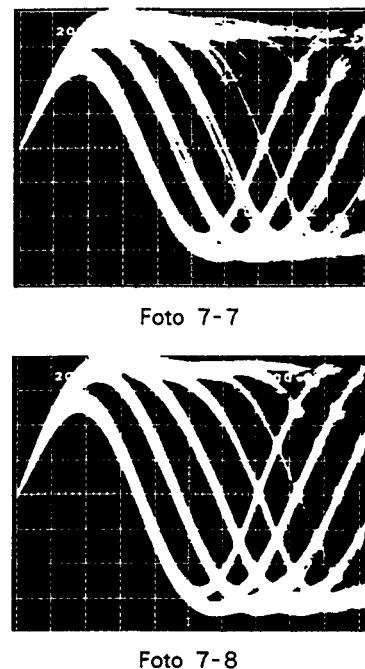


Foto 7-7

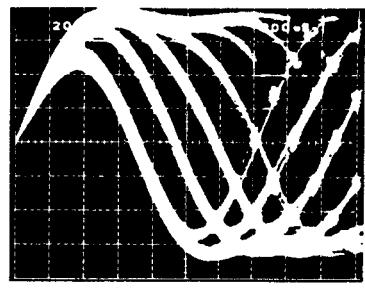


Foto 7-8

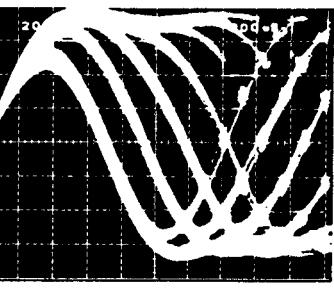


Foto 7-9

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
8	<b>AJUSTE DE GANANCIA DE ENFOQUE</b>					
	20mV/div, 5mV/div. CH1 (X), CH2 (Y) (SONDA 10 : 1)	Eje X : Patilla 5 de TP1 (FCS. IN) Eje Y : Patilla 6 de TP1 (FCS. ERR)	VR3 (FCS. GAN)	Diferencia de fase 90°		<ul style="list-style-type: none"> <li>● En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 7-6.</li> <li>● Ponga la unidad en el modo de reproducción (PLAY) normal.</li> <li>● Encienda el oscilador y extraiga 1.2kHz 2 Vp-p.</li> </ul> <p>Nota : (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por lo tanto, es conveniente conectar el oscilador después del encendido.)</p> <ul style="list-style-type: none"> <li>● Ajuste con el volumen de FCS.GAN (Ganancia de enfoque) de VR3 de modo que la figura de Lissajous del osciloscopio a ser un círculo horizontal (90° de diferencia de fase).</li> </ul>

Fig. 7-6

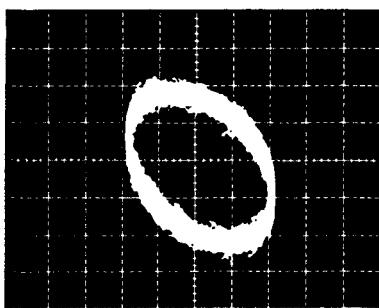


Foto. 7-10 Alta ganancia

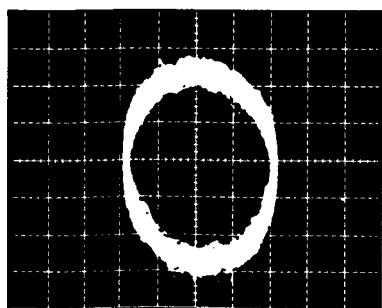


Foto. 7-11 Ganancia óptima

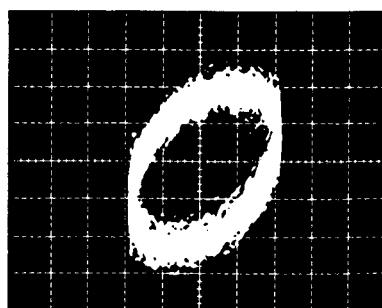


Foto. 7-12 Baja ganancia

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
<b>9 AJUSTE DE GANANCIA DE SEGUIMIENTO</b>						
	50mV/div, 5mV/div CH1 (X), CH2 (Y) (SONDA 10 : 1)	Eje X : Patilla 3 de TP1 (TRK. IN) Eje Y : Patilla 2 de TP1 (TRK. ERR)	VR4 (TRK. GAN)	90° de diferencia		<ul style="list-style-type: none"> <li>● En el estado de POWER OFF (apagado), conecte un osciloscopio y un oscilador como se muestra en la Fig. 7-7.</li> <li>● Ponga la unidad en el modo de reproducción (PLAY) normal.</li> <li>● Encienda el oscilador y extraiga 1,2 kHz 2 Vp-p.</li> </ul> <p>Nota : (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por la tanto, es conveniente conectar el oscilador después del encendido.)</p> <ul style="list-style-type: none"> <li>● Ajuste con el volumen de TRK. GAN de VR4 (Ganancia de seguimiento) de modo que la figura de Lissajous del osciloscopio lleve a ser un círculo horizontal (90° de diferencia de fase).</li> </ul>

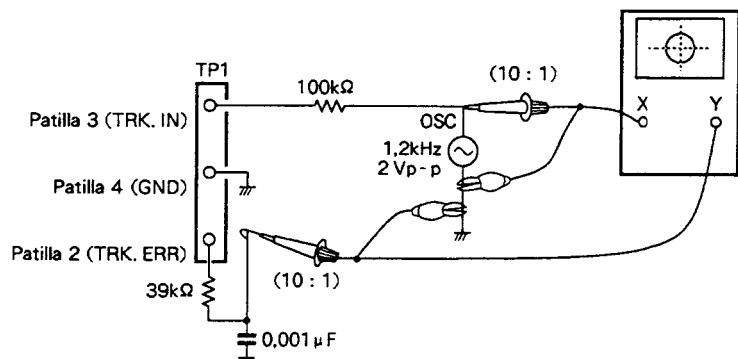


Fig. 7-7

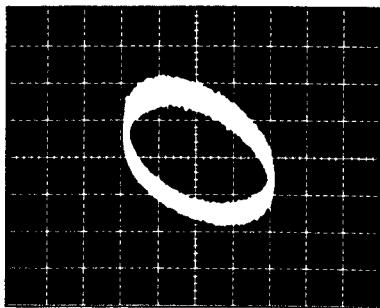


Foto. 7-13 Alta ganancia

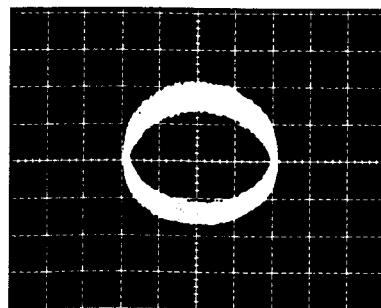


Foto. 7-14 Ganancia óptima

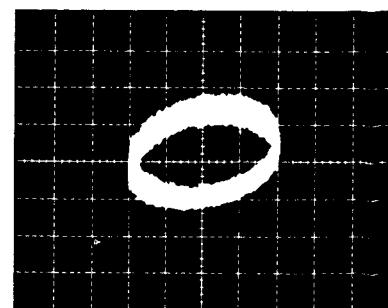


Foto. 7-15 Baja ganancia

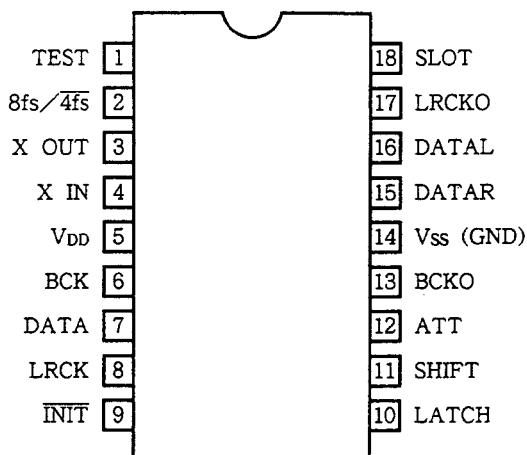
No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste	
	V	H					
10	AJUSTE DE LA FRECUENCIA PROPIA DE VCO			Patilla 2 de TP2 (PLCK)	VR8 (VCO. ADJ)	4,275 ± 0,025MHz	<ul style="list-style-type: none"> <li>● Ajuste el modo de TEST. (Vea la página 49.)</li> <li>● Haga un cortocircuito entre ASY y la conexión volante de GND con Θ destornillador, etc. (Fig. 7-1)</li> <li>● Conecte el frecuencímetro, que pueda medir arriba de 10 MHz, a la patilla 2 de TP2 (PLCK).</li> <li>● Ajuste con el volumen VCO ADJ (ajuste de VCO) de VR8 de modo que el valor del frecuencímetro se ponga en 4,275 ± 0,025 MHz.</li> </ul>
11	METODO PARA CONFIRMAR EL CARACTER S (ERROR DE ENFOQUE)			Patilla 6 de TP1 (FCS. ERR)			<ul style="list-style-type: none"> <li>● Ajuste el modo de TEST. (Vea la página 49.)</li> <li>● Haga un cortocircuito entre FCS. IN (Entrada de enfoque) de la patilla 5 de TP1 y GND.</li> <li>● Presione la tecla de TRACK FWD (<math>\triangleright\triangleright\triangleright</math>) y observe la forma de onda de FCS. ERR (Error de enfoque) de la patilla 6 de TP1 con un osciloscopio.</li> </ul>

## 8. IC INFORMATION

### ■ CXD2550P

Digital filter

#### ● Pin connections (Top view)



#### ● Pin functions

Pin	Pin name	I/O	Function
1	TEST	I	Terminal for TEST (Active : L)
2	8fs/4fs	I	Designation of FIR3 H : 8fs, L : 4fs
3	X OUT	O	Crystal OSC circuit output (f = 384fs)
4	X IN	I	Crystal OSC circuit input (f = 384fs)
5	VDD	-	+5V power supply
6	BCK	I	Bit clock input
7	DATA	I	Serial data input (2's complement)
8	LRCK	I	LR clock input
9	INIT	I	Synchronization is made again at the leading edge of the main signal.
10	LATCH	I	Signal input of latch clock
11	SHIFT	I	signal input of shift clock
12	ATT	I	Data input of attenuator
13	BCKO	O	BCK output
14	Vss (GND)	-	Ground terminal
15	DATAR	O	At 4fs : Word clock At 8fs : R ch serial data output (2's complement)
16	DATAL	O	At 4fs : Divided serial data output at L ch and R ch.(2's complement) At 8fs : Lch serial data output (2's complement)
17	LRCKO	O	LR select clock output
18	SLOT	I	Designation of output slot H : 18 bit slot, L : 16 bit slot

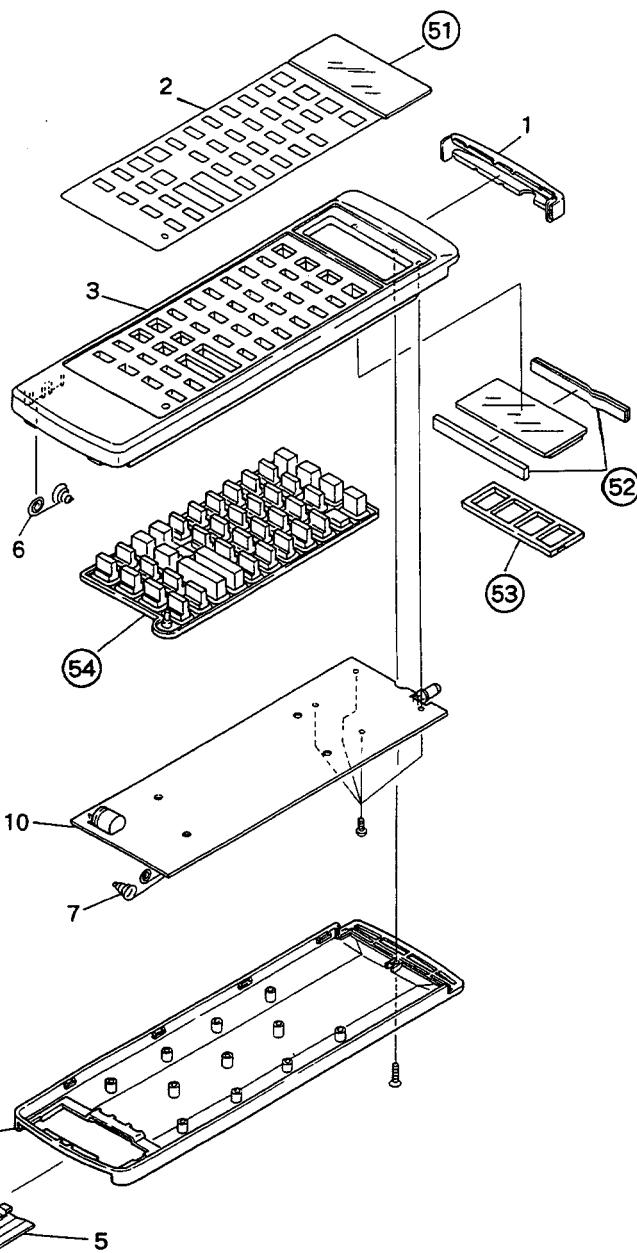
## 9. REMOTE CONTROL UNIT (FOR PD-M610 TYPE)

### NOTES :

- Parts without part number cannot be supplied.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by “ $\odot$ ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

### 9.1 PARTS LIST OF REMOTE CONTROL UNIT

<u>Mark</u>	<u>No.</u>	<u>Part No.</u>	<u>Description</u>
1	PZA1003		Filter
2	PZA1001		Name plate
3	PZN1002		Case A
4	PZN1003		Case B
5	PZN1004		Battery cover
6	PZK1001		Terminal A (battery)
7	PZK1002		Terminal B (battery)
8	PZA1004		Panel
9	PZB1003		Battery spring
10	PZW1001		Remote control board assembly
51			Window
52			Connector
53			Frame
54			Rubber switch



### 9.2 ELECTRICAL PARTS LIST

#### SEMICONDUCTORS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
IC1		PD5115
D1		SE308AC-Y

#### OTHERS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
X1	Crystal resonator	DT-38
X2	Ceramic resonator	CSB-480EB20

## 9.3 SCHEMATIC DIAGRAM

REMOTE CONTROL BOARD ASSEMBLY (PZW1001)

A

## 1. RESISTORS :

Indicated in  $\Omega$ , 1/4W, 1/6W and 1/8W,  $\pm 5\%$  tolerance unless otherwise noted k ;  $k\Omega$ , M ;  $M\Omega$ , (F) ;  $\pm 1\%$ , (G) ;  $\pm 2\%$ , (K) ;  $\pm 10\%$ , (M) ;  $\pm 20\%$  tolerance.

## 2. CAPACITORS :

Indicated in capacity ( $\mu F$ ) / voltage (V) unless otherwise noted p ;  $pF$ . Indication without voltage is 50V except electrolytic capacitor.

## 3 OTHERS :

$\rightarrow$  ; Signal route.

$\odot$  ; Adjusting point.

The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

\* marked capacitors and resistors have parts numbers.

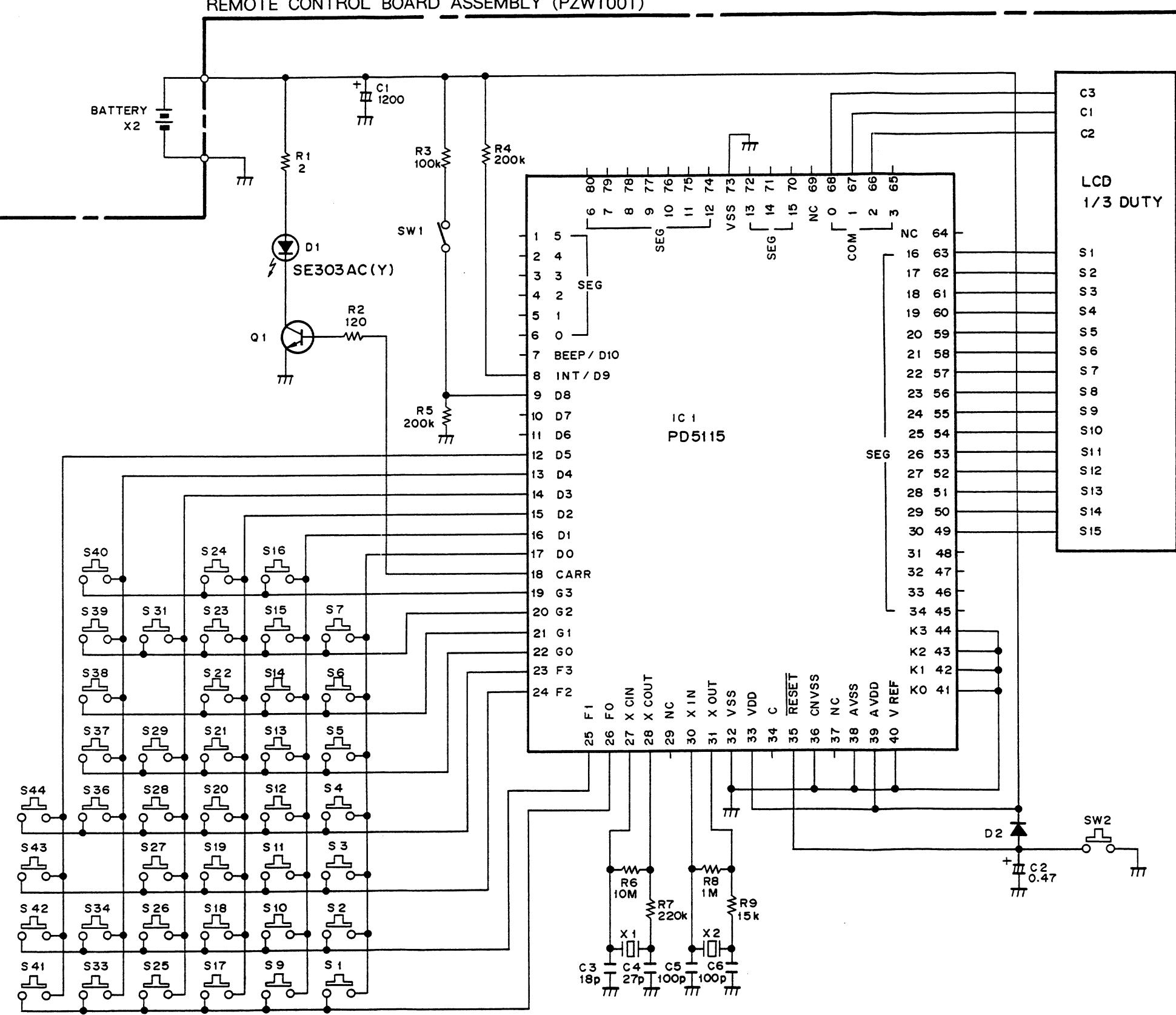
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

## 4. SWITCHES : (The underlined indicates the switch position)

SW1 : REMOTE POWER ON/OFF  
(When the battery cover is removed.)

SW2 : RESET

S1 : A	S21 : 7
S2 : B	S22 : 8
PROGRAM	TRACK NUMBER
S3 : C	S23 : 9
S4 : D	S24 : 10
S5 : 1	S25 : PGM
S6 : 2	S26 : CHECK
S7 : 3	S27 : CLEAR
DISC NUMBER	S28 : DELETE
S9 : 4	S29 : EJECT $\Delta$
S10 : 5	S31 : RANDOM PLAY
S11 : 6	S33 : STOP ■
S12 : TRANS $\oplus$	S34 : PAUSE □
S13 : 1	S36 : PLAY ▶
S14 : 2	S37 : ▲◀
TRACK NUMBER	MANUAL
S15 : 3	S38 : ▶▶
S16 : + 10	TRACK
S17 : 4	S40 : ▶▶◀◀
S18 : 5	TRACK NUMBER
S19 : 6	S41 : IN
S20 : ≥ 20	S42 : OUT
	S43 : -
	LEVEL
	S44 : +



C3	C1	C2
LCD	1/3 DUTY	
S1		
S2		
S3		
S4		
S5		
S6		
S7		
S8		
S9		
S10		
S11		
S12		
S13		
S14		
S15		

X1 : DT-38  
X2 : CSB-480EB20

A

B

C

D

## 9.4 IC INFORMATION

## ■ PD5115

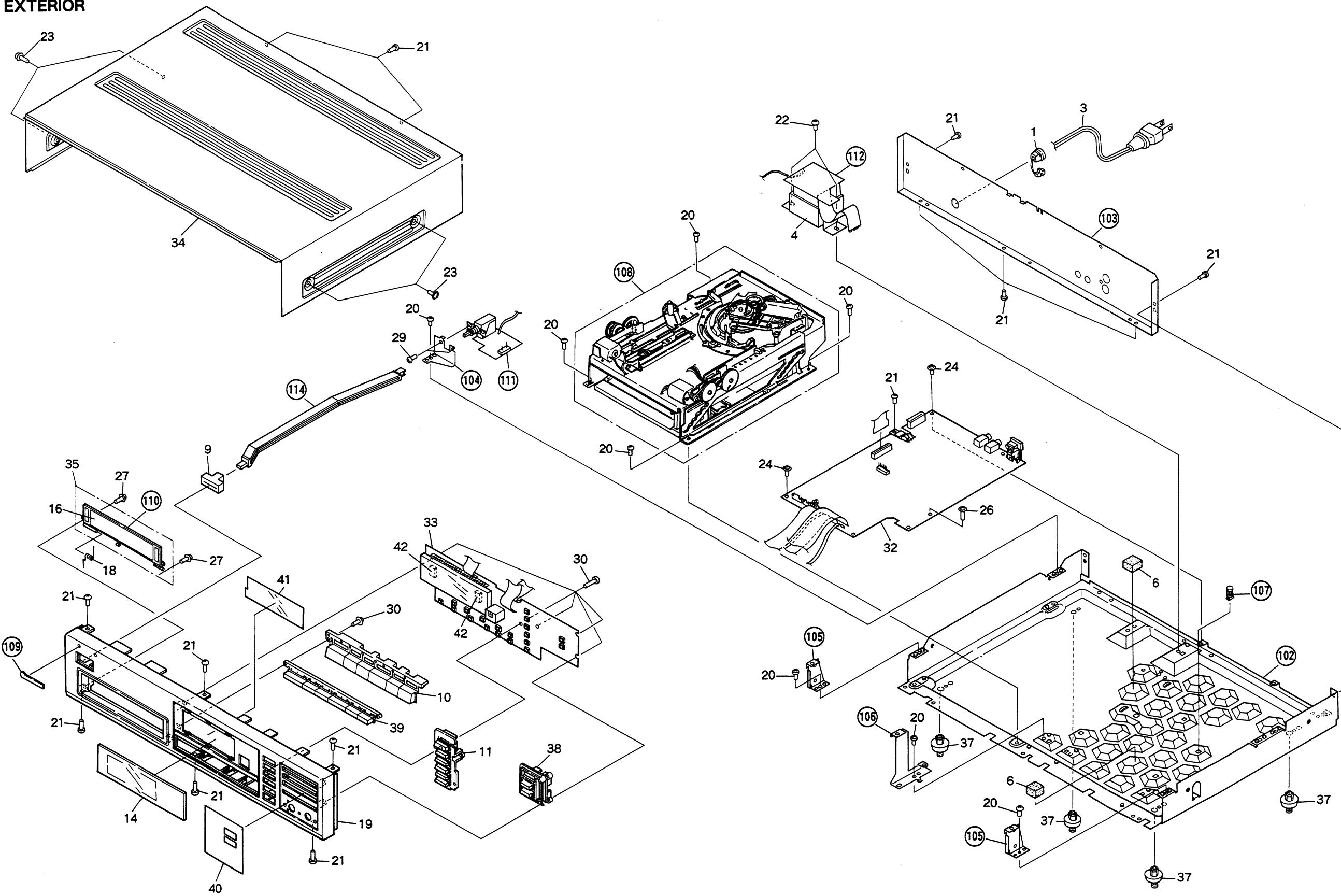
Microcomputer for remote control

## ● Pin function

Pin No.	Pin name	I/O	Function and Operation	Pin No.	Pin name	I/O	Function and Operation
1 7	N.C			38	AVss		GND
				39	AVDD		Power supply } A-D converter
8	INT/D9	I/O	I/O port D Inputs and outputs data in 1-bit unit. Input is possible when the output latch is programmed for "1". Output circuit is of N-channel open drain type.	40	VREF	I	Input terminal of reference power supply voltage for the A-D converter.
9	D8			41	K0		
10 11	N.C			42	K1		
12	D5			43	K2		
13	D4			44	K3		
14	D3			45	N.C		
15	D2			48			
16	D1			49	SEG30		
17	D0			50	SEG29		
18	CARR	O	Carrier output terminal for the remote control.	51	SEG28		
19	G3			52	SEG27		
20	G2			53	SEG26		
21	G1			54	SEG25		
22	G0			55	SEG24		
23	F3			56	SEG23		
24	F2			57	SEG22		
25	F1			58	SEG21		
26	F0			59	SEG20		
27	X CIN	I	I/O terminals of f(X CIN) clock circuit. Connect the crystal (32.768kHz) between 27 and 28 terminals.	60	SEG19		
28	X COUT	O		61	SEG18		
29	N.C			62	SEG17		
30	X IN	I		63	SEG16		
31	X OUT	O	I/O terminals of f(X IN) clock circuit.	64	N.C		
32	Vss		Ground	65	N.C		
33	VDD		Power supply	66	COM2		
34	N.C			67	COM1		
35	RESET	I	Input terminal of reset signal. If the "L" level is applied for more than 1 machine cycle to this connector, the micro computer will be reset.	68	COM0		
36	CNVss	I	Connect to Vss (GND). Active : L (ON)	69	N.C		
37	N.C			70 72	N.C		
				73	Vss		Ground
				74 80	N.C		

## **10. EXPLODED VIEWS AND PARTS LIST (FOR PD-M510/KU TYPE)**

## **10.1 EXTERIOR**



## 11. SCHEMATIC DIAGRAM (FOR PD-M510/KU TYPE)

### 1. RESISTORS :

Indicated in  $\Omega$ , 1/4W, 1/6W and 1/8W,  $\pm 5\%$  tolerance unless otherwise noted k ;  $k\Omega$ , M ;  $M\Omega$ , (F) ;  $\pm 1\%$ , (G) ;  $\pm 2\%$ , (K) ;  $\pm 10\%$ , (M) ;  $\pm 20\%$  tolerance.

### 2. CAPACITORS :

Indicated in capacity ( $\mu F$ ) / voltage (V) unless otherwise noted p ;  $pF$ . Indication without voltage is 50V except electrolytic capacitor.

### 3. VOLTAGE, CURRENT :

$\square$  : DC voltage (V) at play state.  
 $\leftarrow m A$  : DC current at play state.  
 Value in ( ) is DC current at stop state.

### 4. OTHERS :

$\rightarrow$  : Signal route.  
 $\odot$  : Adjusting point.

The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.  
 \* marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

### 5. SWITCHES : (The underlined indicates the switch position)

#### OUTSIDE OF P.C.BOARD ASSEMBLY

S101 : INSIDE ON — OFF

#### MAIN BOARD ASSEMBLY

S1 : TEST MODE ON — OFF

#### FUNCTION BOARD ASSEMBLY

S201 : EJECT

S202 : 1

S203 : 2

S204 : 3

S205 : 4

S206 : 5

S207 : 6

S216 : TIME

S217 : PROGRAM

S218 : CLEAR

S222 : REPEAT

S223 : MANUAL SEARCH (◀◀)

S224 : MANUAL SEARCH (▶▶)

S225 : PLAY

S226 : RANDOM PLAY

S227 : TRACK SEARCH (◀◀)

S228 : TRACK SEARCH (▶▶)

S229 : PAUSE

S230 : STOP

(DISC NO.)

#### SWITCH BOARD ASSEMBLY

S801 : LPS1 LOADING POSITION

S802 : LPS2

	STOP	DURING THE LOADING	CLAMP CONDITION PLAY	DURING THE EJECT
S801	ON (H)	OFF (L)	OFF (L)	ON (H)
S802	ON (H)	ON (H)	OFF (L)	OFF (L)

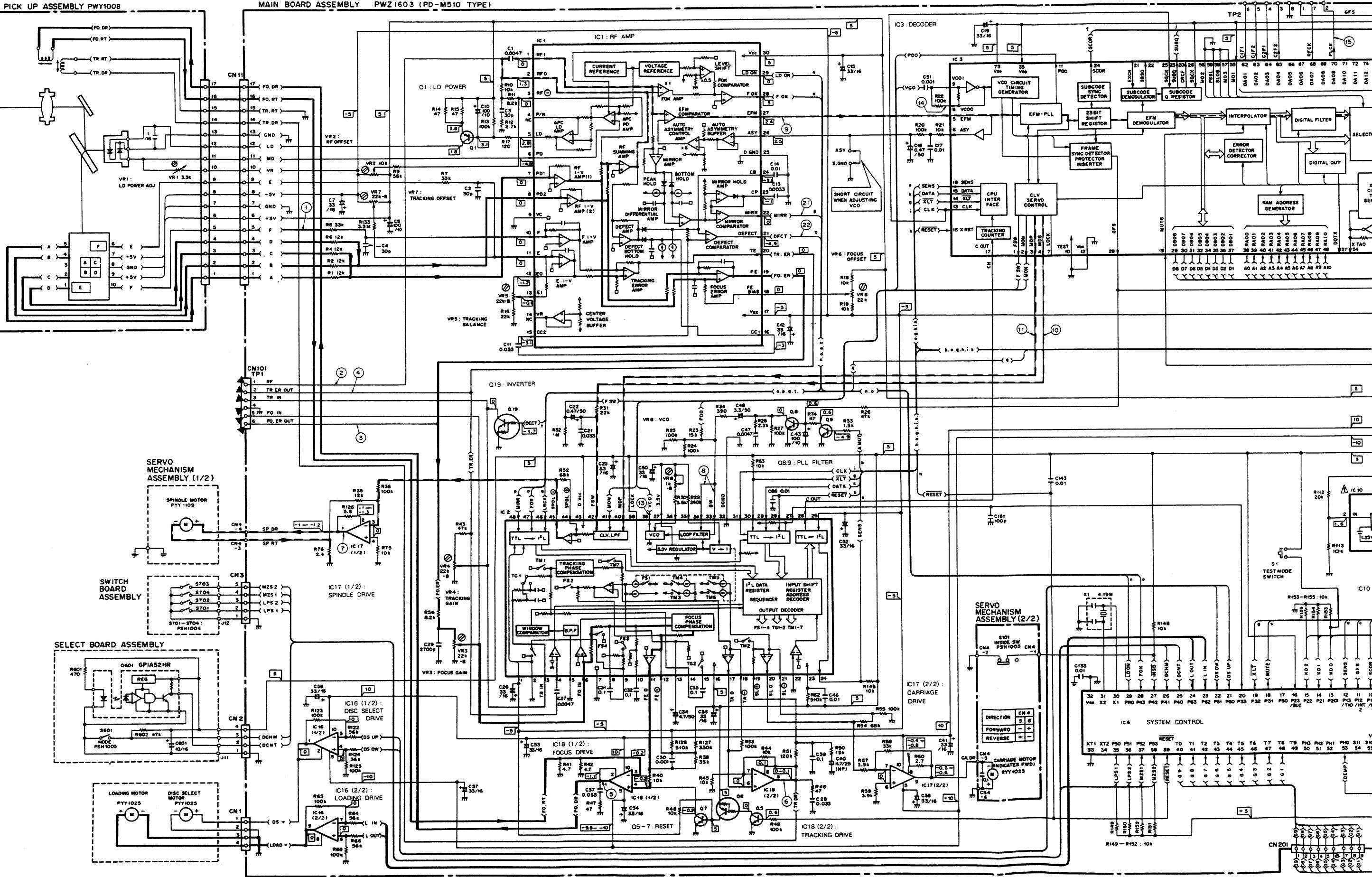
S803 : MZS2 MAGAZINE

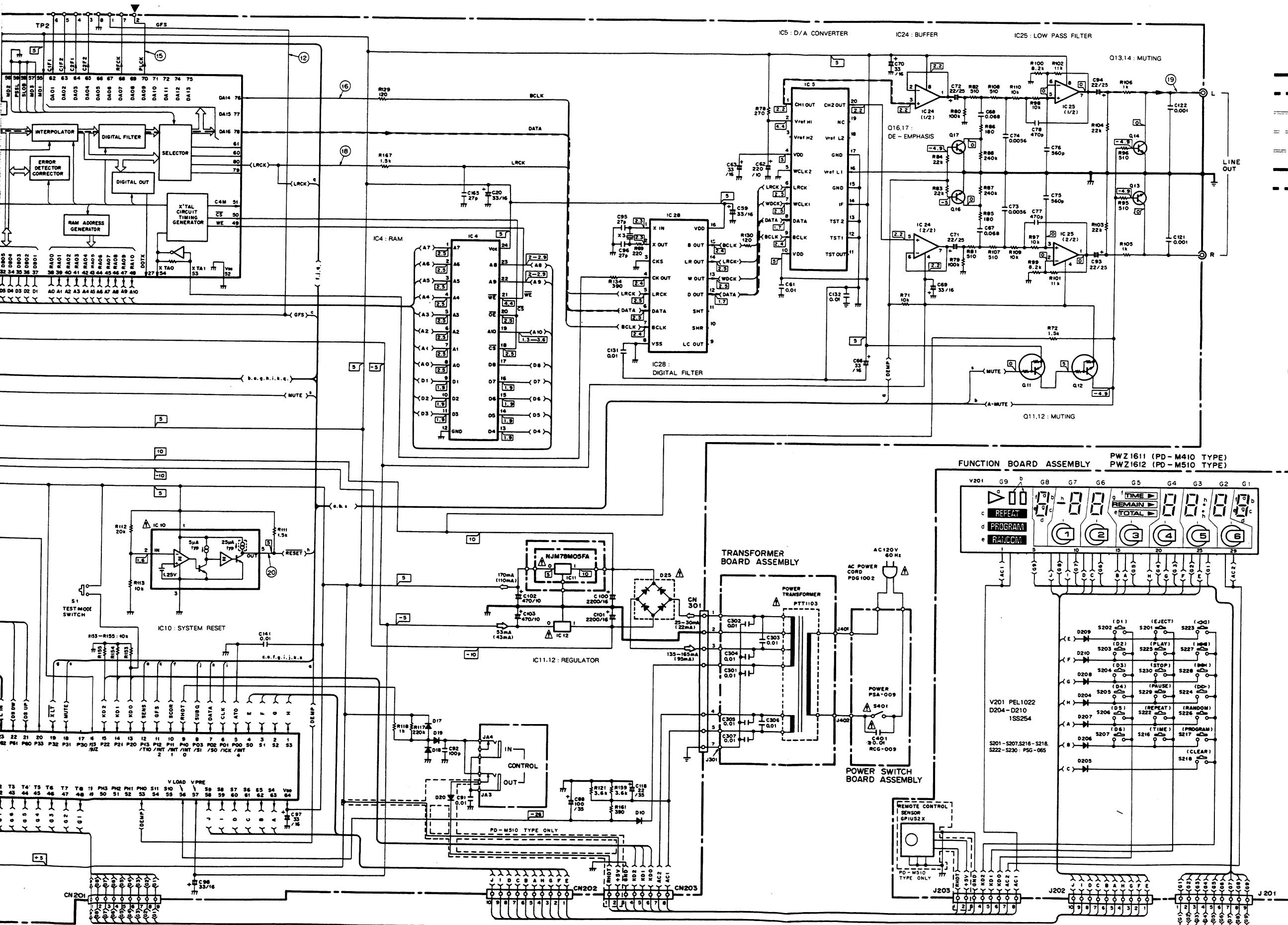
S804 : MZS1

	NO MAGAZINE	SIX MAGAZINES	SINGLE
S803	ON (H)	OFF (L)	OFF (L)
S804	OFF (L)	ON (H)	OFF (L)

#### POWER SWITCH BOARD ASSEMBLY

S401 : POWER ON—OFF





► : Measurement point  
**SIGNAL ROUTE :**  
 — : Focus servo loop  
 - - - : Signal route  
 - - - - : Tracking servo loop  
 - - - - - : Carriage servo loop  
 - - - - - - : Disc select motor route  
 - - - - - - - : Loading motor route  
 - - - - - - - - : Spindle motor route

A

B

C

D

IC2  
(CXA1082BS)

Pin No.	Voltage	Pin No.	Voltage
1	-5	25	-5
2	0	26	0
3	0	27	5
4	0	28	5
5	0	29	5
6	0	30	5
7	0	31	5
8	0	32	0
9	0	33	2.5
10	0	34	2.5
11	0	35	2.3
12	0	36	2.3
13	0.2	37	3.5
14	0	38	2.4
15	0	39	5
16	5	40	2.5
17	0	41	5
18	0	42	2.5
19	0	43	5
20	0	44	0
21	0	45	0.2 - 0.6
22	0	46	2.5
23	-4.1	47	5
24	5	48	0

IC3  
(CXD1130QZ)

Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5
2	5	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 - 2.9
7	5	47	2.0 - 2.9
8	2.4	48	1.3 - 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5	53	2.2
14	5	54	2.2
15	5	55	5
16	5	56	0
17	0	57	0
18	5	58	0
19	0	59	0
20	5	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5	65	0
26	5	66	0
27	2.5	67	0
28	5	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5
32	1.9	72	0
33	5	73	5
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

IC6  
(PD4150A)

Pin No.	Voltage	Pin No.	Voltage
1	-13.2	33	0
2	-16.2 - - 22.1	34	5
3	-10 - - 13	35	0
4	-12.3 - - 15.4	36	0
5	0	37	0
6	5	38	5
7	5	39	5
8	0.2 - 3.5	40	-22.4
9	4.9	41	-22.4
10	0.1	42	-22.5
11	5	43	-22.5
12	5	44	-22.6
13	0	45	-22.6
14	0	46	-22.5
15	0	47	-22.6
16	5	48	-22.6
17	5	49	-25.5
18	0	50	5
19	5	51	0.1
20	5	52	5
21	0	53	-5
22	0	54	-19.5
23	0	55	-6.9 - - 7.3
24	0	56	-25.9
25	5	57	-5
26	5	58	-22.4
27	5	59	-7.4 - - 7.6
28	5	60	-12.5 - - 15.4
29	0	61	-0.9 - - 4
30	2.3	62	-3.9
31	2.3	63	-9.3 - - 12.4
32	0	64	5

## 12. P. C. BOARDS CONNECTION DIAGRAM (FOR PD-M510/KU TYPE)

P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
		Diode			Styrol capacitor
		Zenner diode			Electrolytic capacitor (Noiseless)
		LED			Power capacitor
		Varactor			Semi-fixed resistor
		Tact switch			Resistor array
		Inductor			Resistor
		Coil			Resonator
		Transformer			Thermistor
		Filter			

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with shows negative terminal.
4. The diode marked with shows cathode side.
5. The transistor terminal marked with shows emitter.

1

2

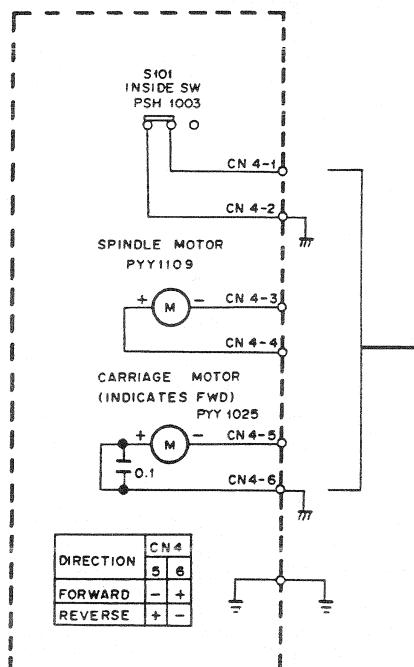
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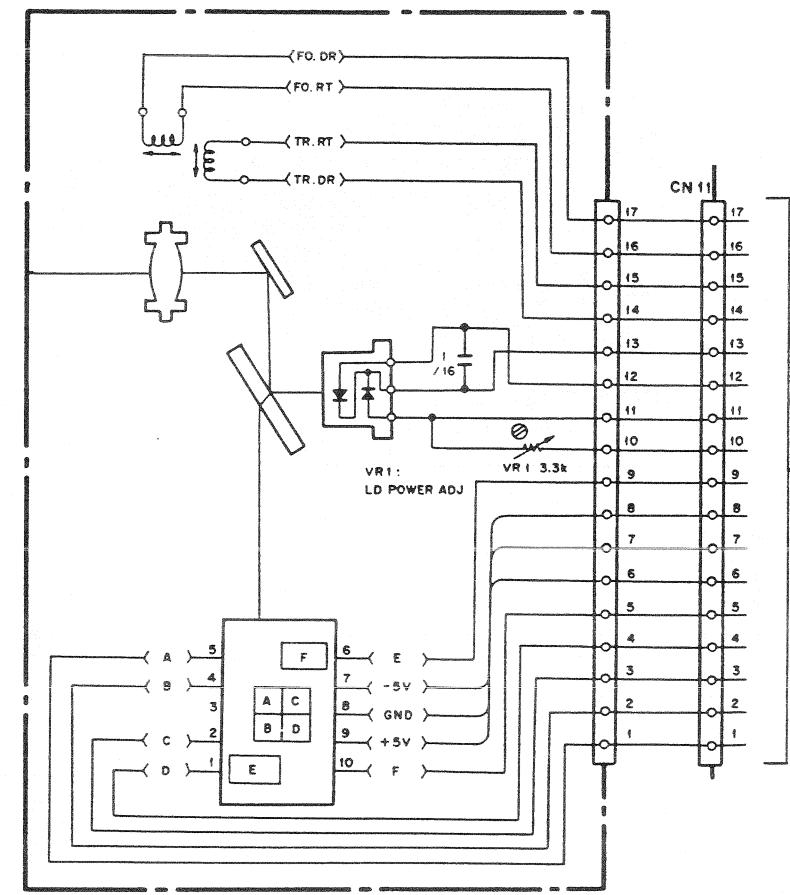
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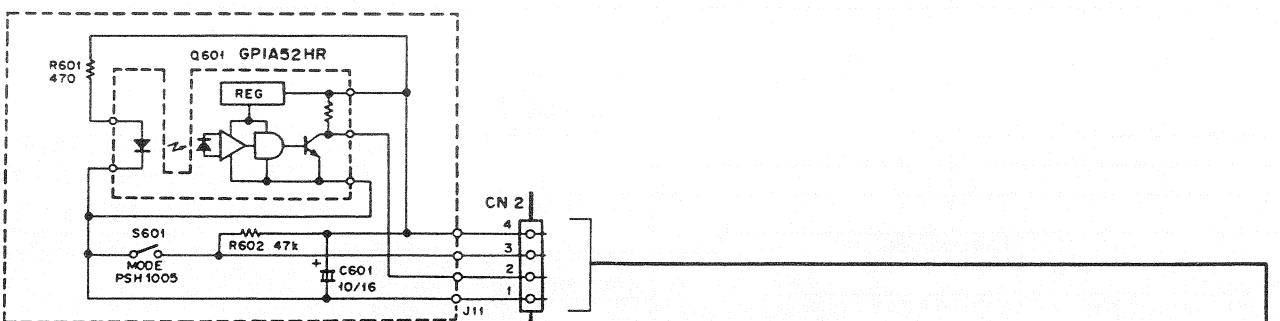
SERVO MECHANISM  
ASSEMBLY



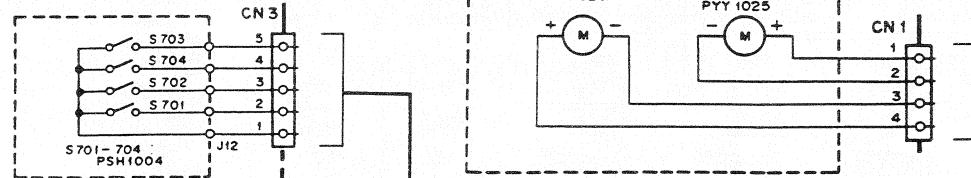
PICKUP ASSEMBLY (PWY1008)



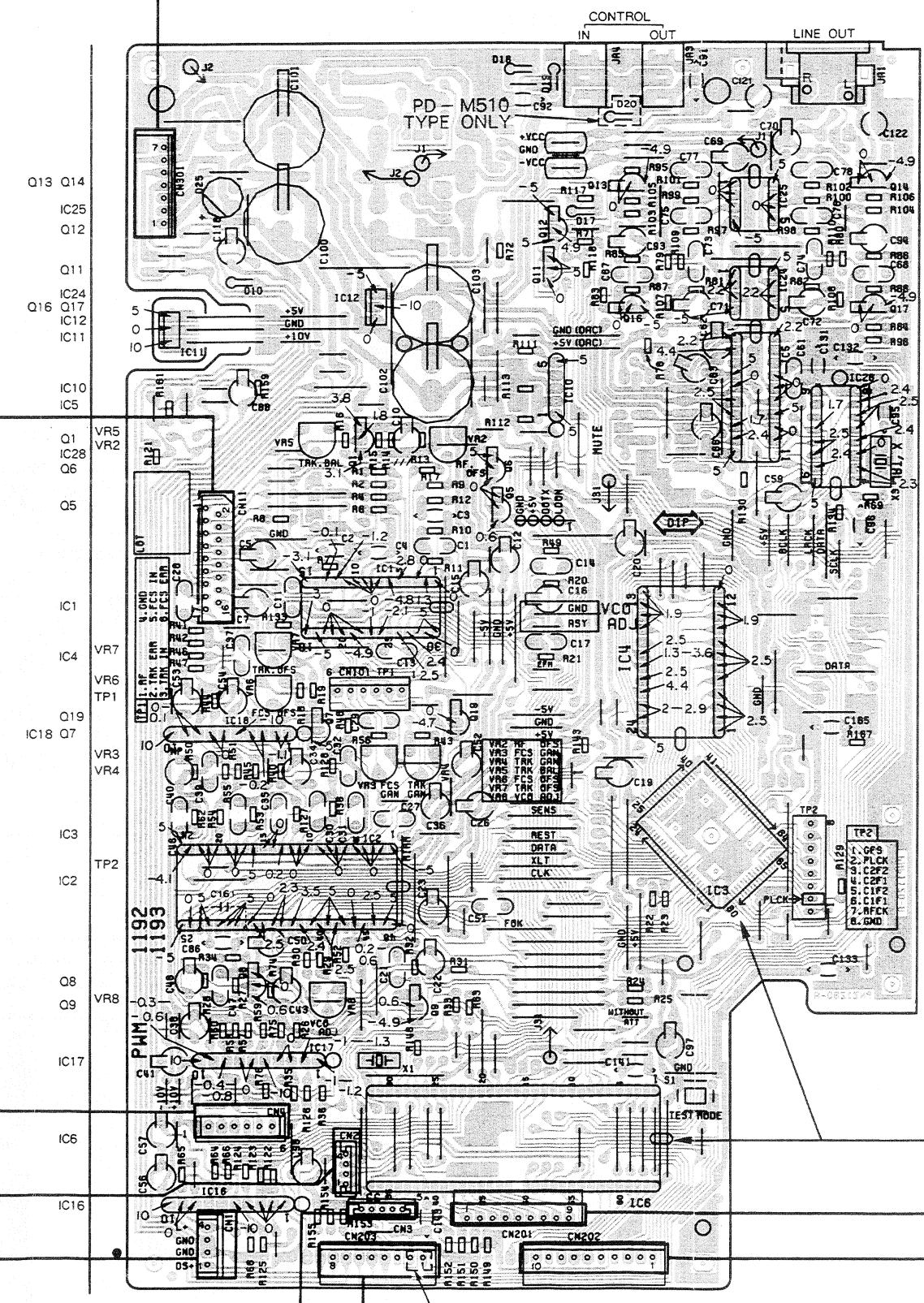
SELECT BOARD ASSEMBLY



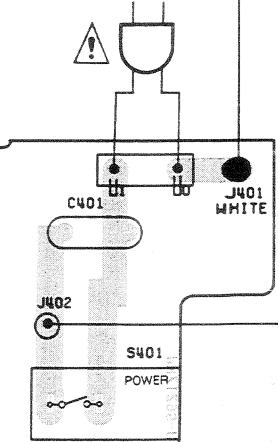
SWITCH BOARD  
ASSEMBLY



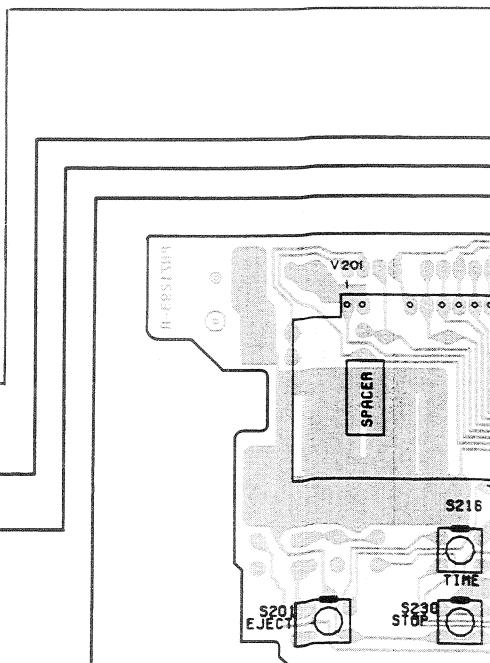
MAIN BOARD ASSEMBLY (PWZ1602: PD-M410 TYPE)  
(PWZ1603: PD-M510 TYPE)



AC POWER CORD  
AC120V  
60Hz



POWER SWITCH  
BOARD ASSEMBLY



1

2

3

4

5

6

4

5

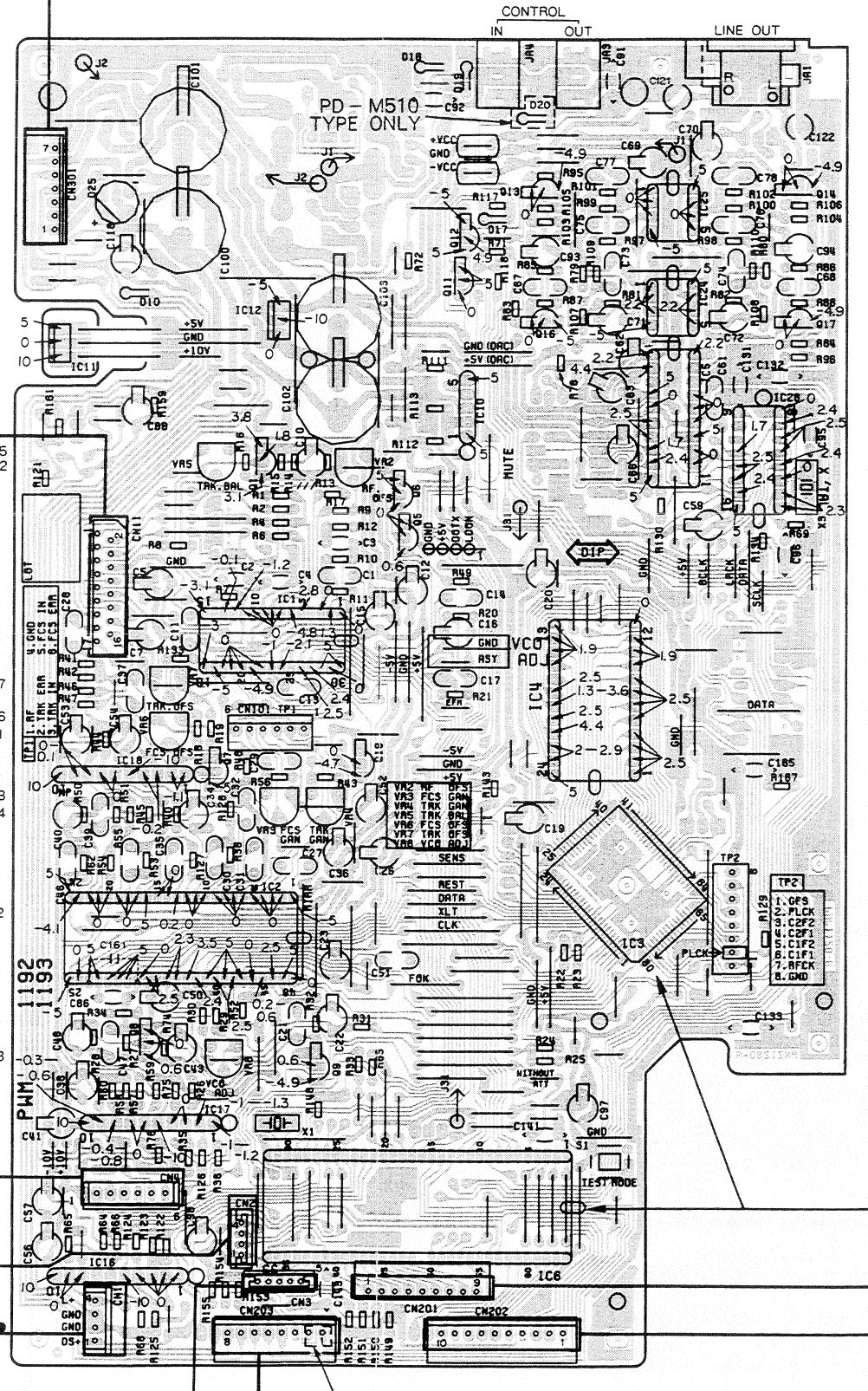
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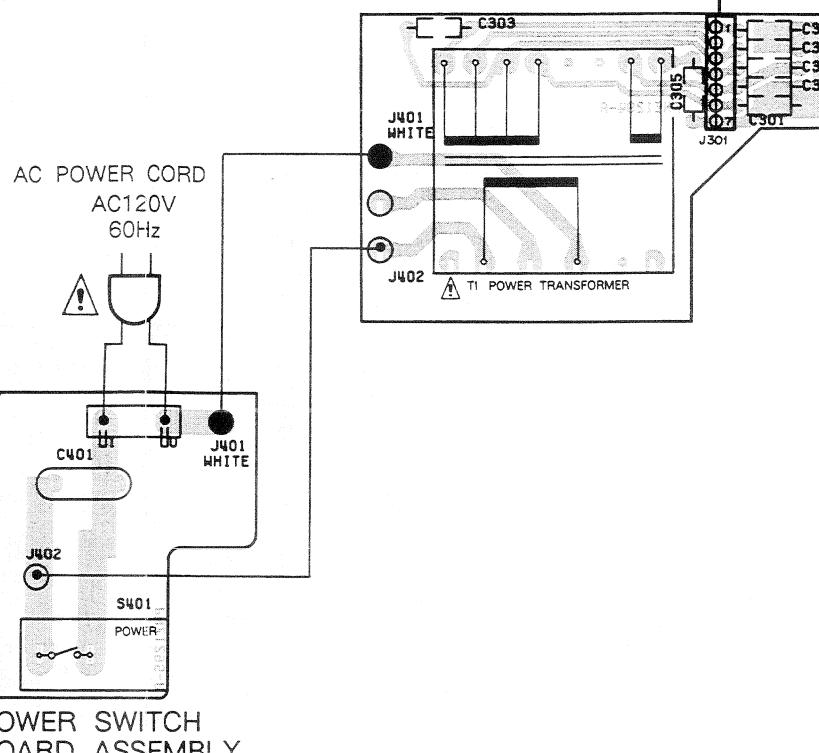
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9

**MAIN BOARD ASSEMBLY (PWZ1602: PD-M410 TYPE)  
(PWZ1603: PD-M510 TYPE)**



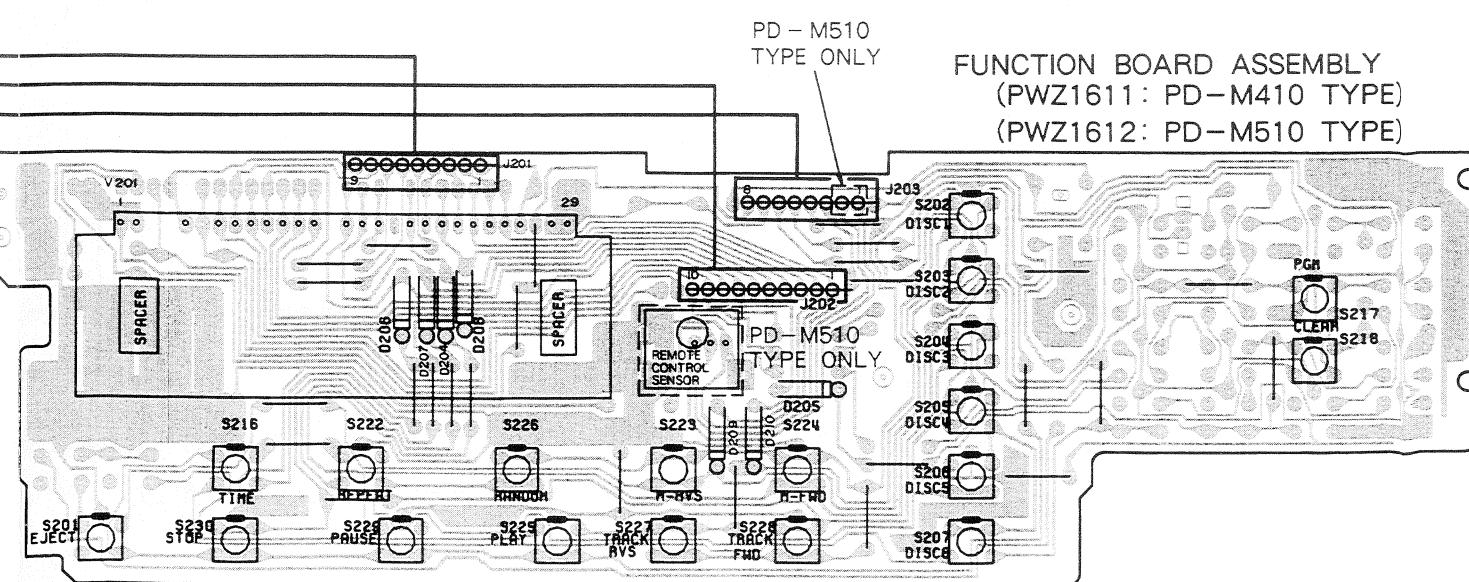
## TRANSFORMER BOARD ASSEMBLY



IC3	Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5	
2	5	42	2.5	
3	2.5	43	2.5	
4	2.8	44	2.5	
5	2.4	45	2.5	
6	2.5	46	2.0 - 2.9	
7	5	47	2.0 - 2.9	
8	2.4	48	1.3 - 3.6	
9	2.4	49	4.4	
10	0	50	2.5	
11	1.8	51	2.3	
12	0	52	0	
13	5	53	2.2	
14	5	54	2.2	
15	5	55	5	
16	5	56	0	
17	0	57	0	
18	5	58	0	
19	0	59	0	
20	5	60	1.3	
21	0	61	1.3	
22	0	62	0	
23	0	63	0	
24	0	64	0	
25	5	65	0	
26	5	66	0	
27	2.5	67	0	
28	5	68	2.5	
29	1.9	69	2.5	
30	1.9	70	2.3	
31	1.9	71	5	
32	1.9	72	0	
33	5	73	5	
34	1.9	74	0	
35	1.9	75	2.4	
36	1.9	76	2.3	
37	1.9	77	2.3	
38	2.5	78	2.5	
39	2.5	79	2.5	
40	2.5	80	2.5	

Pin No.	Voltage	Pin No.	Voltage
1	-13.2	33	0
2	-16.2 - -22.1	34	5
3	-10 - -13	35	0
4	-12.3 - -15.4	36	0
5	0	37	0
6	5	38	5
7	5	39	5
8	0.2 - 3.5	40	-22.4
9	4.9	41	-22.4
10	0.1	42	-22.5
11	5	43	-22.5
12	5	44	-22.5
13	0	45	-22.5
14	0	46	-22.5
15	0	47	-22.6
16	5	48	-22.6
17	5	49	-25.5
18	0	50	5
19	5	51	0.1
20	5	52	5
21	0	53	-5
22	0	54	-19.3
23	0	55	-6.9 - -7.3
24	0	56	-25.9
25	5	57	-5
26	5	58	-22.4
27	5	59	-7.4 - -7.6
28	5	60	-12.5 - -15.4
29	0	61	-0.9 - -4
30	2.3	62	-3.9
31	2.3	63	-9.3 - -12.4
32	0	64	5

**FUNCTION BOARD ASSEMBLY  
(PWZ1611: PD-M410 TYPE)  
(PWZ1612: PD-M510 TYPE)**



4

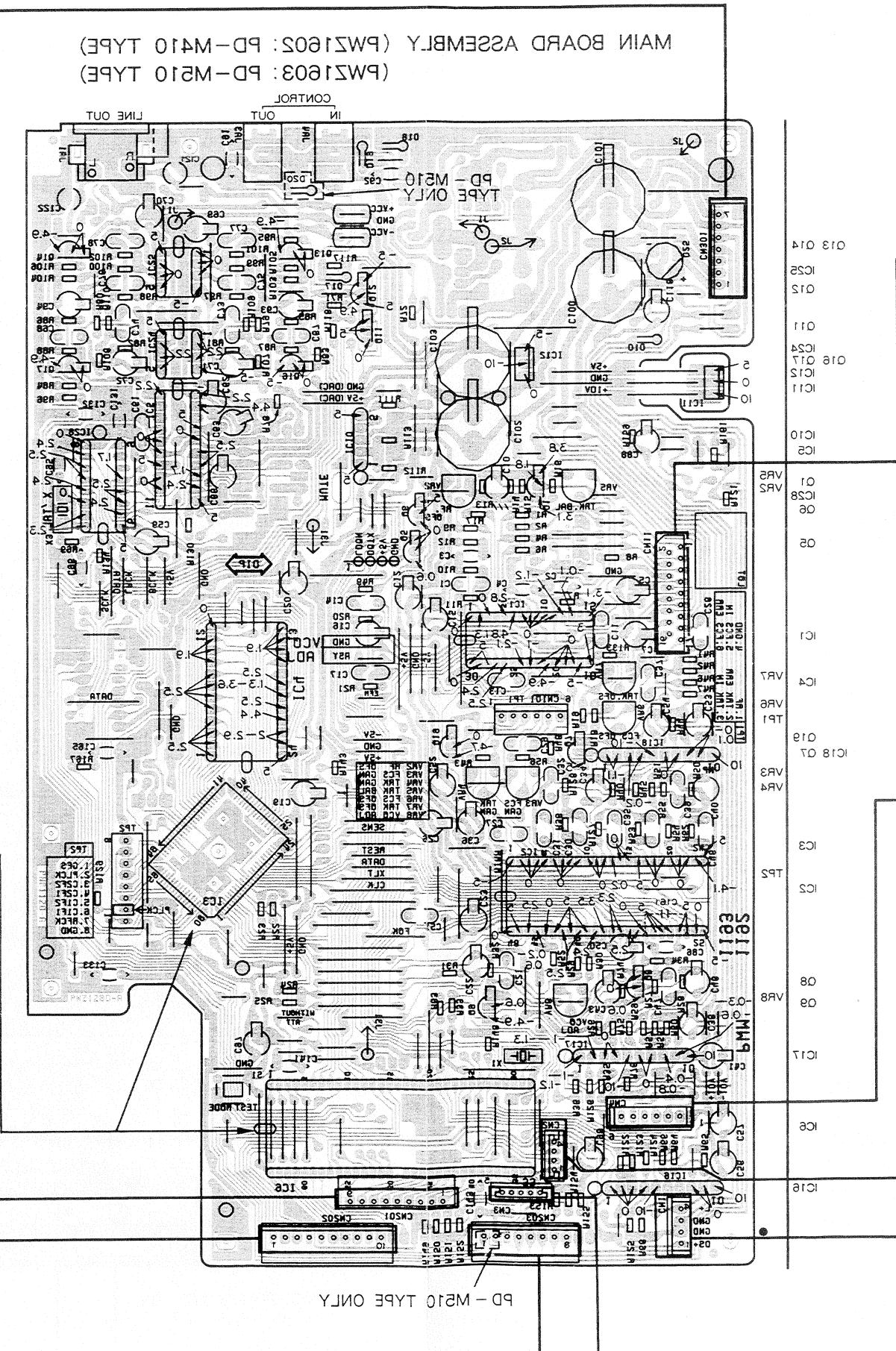
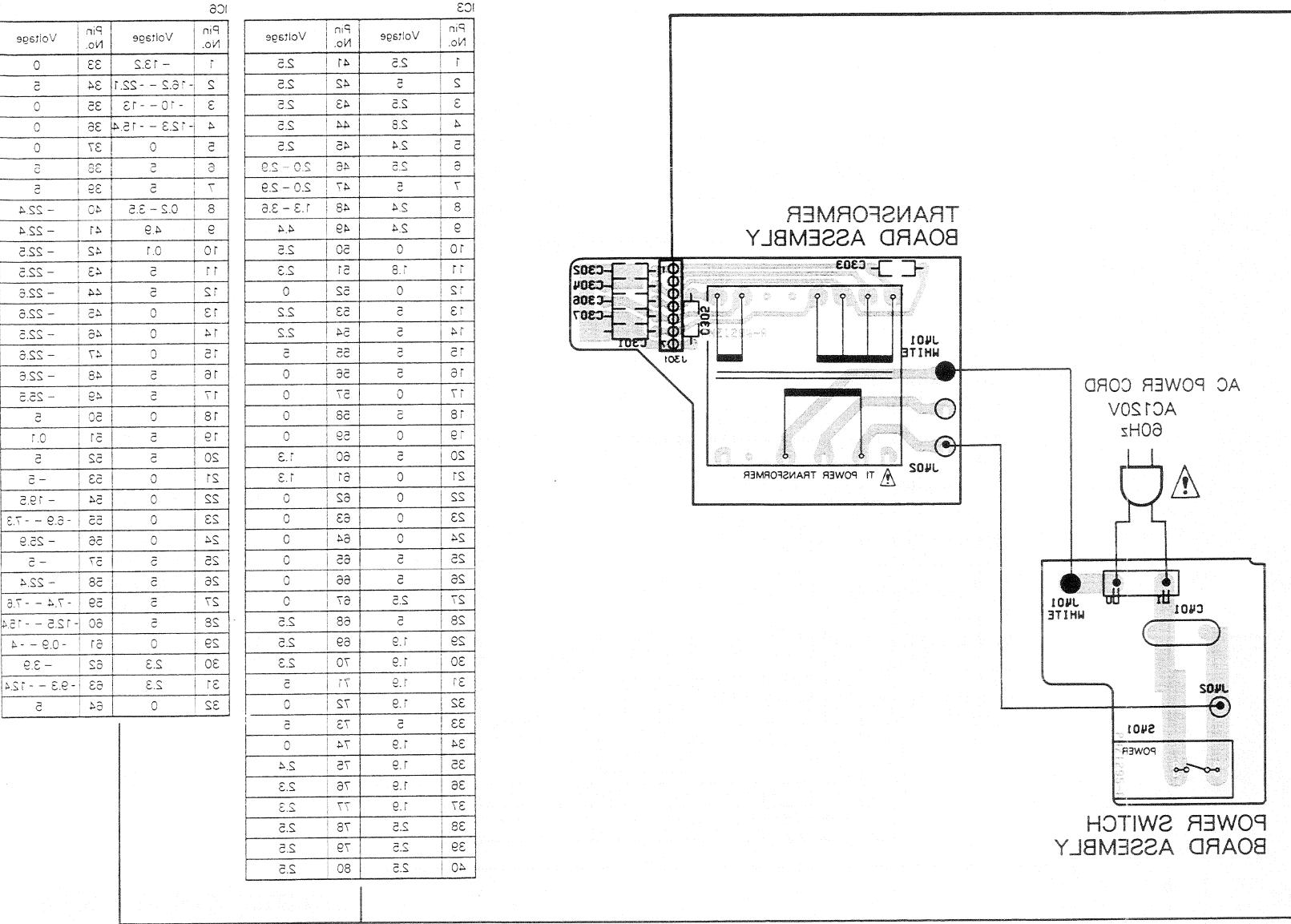
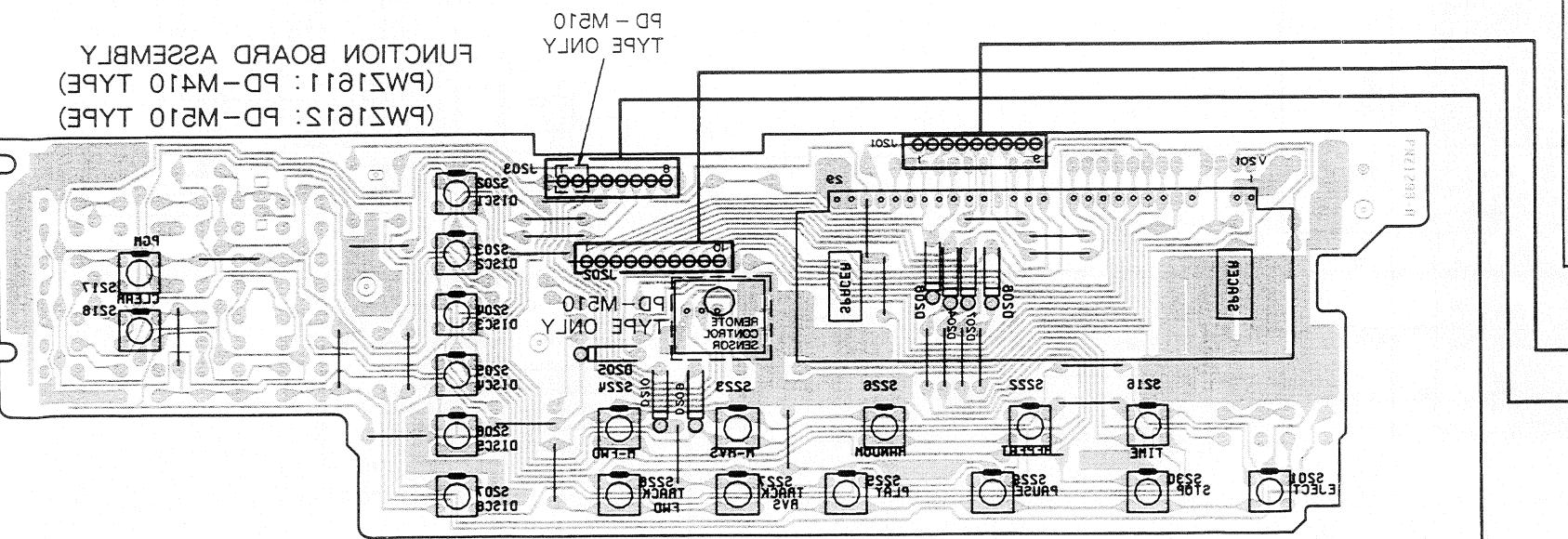
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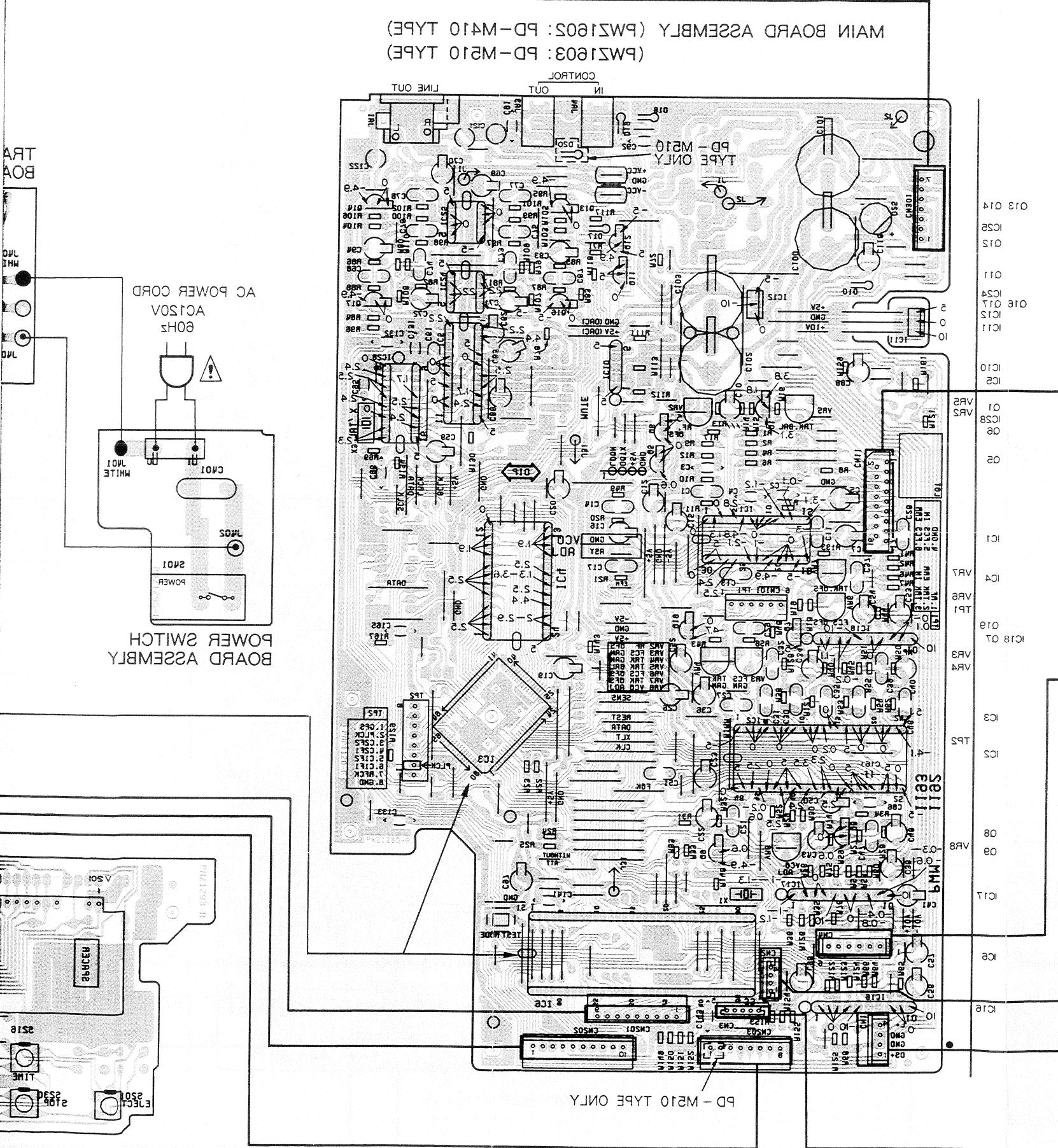
6

7

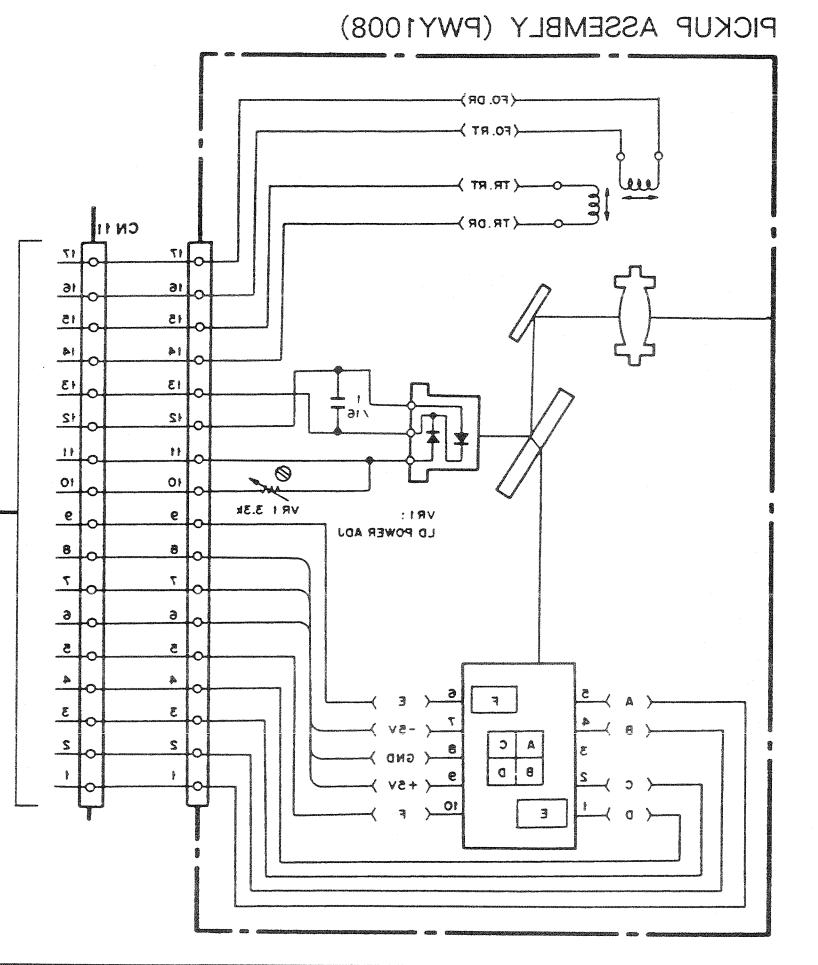
8

9

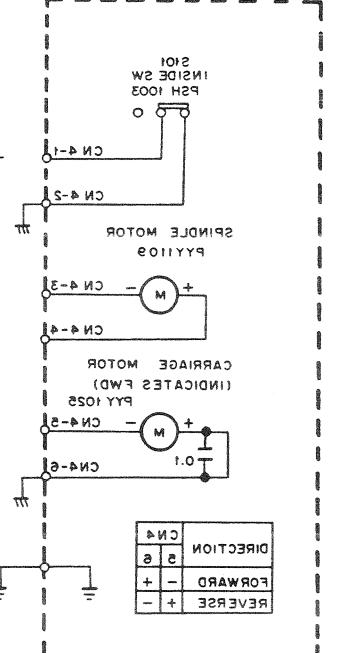




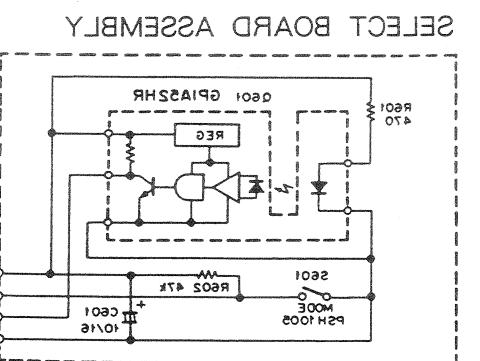
This P.C.B. connection diagram is viewed from the foil side.



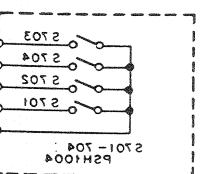
**SERVO MECHANISM  
ASSEMBLY**



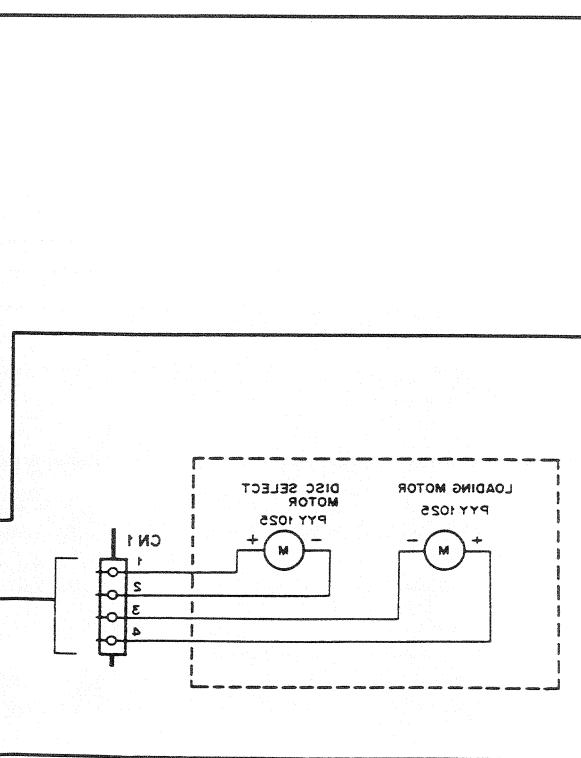
**B**



**SWITCH BOARD  
ASSEMBLY**



**D**



## 13. ELECTRICAL PARTS LIST (FOR PD-M510/KU TYPE)

### NOTES :

- Parts without part number cannot be supplied.
- Parts marked by "◎" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.  
 Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).  
 560 Ω → 56 × 10<sup>1</sup> → 561 ..... RD1/4PS 5 6 1 J  
 47k Ω → 47 × 10<sup>3</sup> → 473 ..... RD1/4PS 4 7 3 J  
 0.5 Ω → 0R5 ..... RN2H 0 R 5 K  
 1 Ω → 010 ..... RS1P 0 1 0 K  
 Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).  
 5.62k Ω → 562 × 10<sup>1</sup> → 5621 ..... RN1/4SR 5 6 2 1 F

### Miscellaneous Parts

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	Power switch board assembly	
	Select board assembly	
◎	Function board assembly	PWZ1612
◎	Main board assembly	PWZ1603
	Transformer board assembly	
	Switch board assembly	
△	Strain relief	CM-22C
△	AC power cord	PDG1002
△	Power transformer	PTT1103
	Pickup assembly	PWY1008
	Spindle motor	PXM1001
	Motor assembly (LOADING,DISC SELECT, CARRIAGE)	PYY1025
	S101 Slide switch (INSIDE)	PSH1003
	Remote control unit	PWW1034

### Power Switch Board Assembly

#### SWITCH

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
△	S401 Push switch (POWER)	PSA-009
	CAPACITOR	
△	C401 (0.01μF)	RCG-009

### Select Board Assembly

#### SEMICONDUCTOR

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	Q601	GP1A52HR
	SWITCH	
△	S601 Slide switch (MODE)	PSH1005
	CAPACITOR	
△	C601	CEAL100M16
	RESISTORS	
△	R601,R602	RD1/6PM □□□J

#### ◎ Function Board Assembly (PWZ1612)

#### SEMICONDUCTORS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	D204 – D210	ISS254
	SWITCHES	
△	S201 – S207,S216 – S218, S222 – S230 Tact switch EJECT, DISC (1 – 6), TIME, PGM, CLEAR, REPEAT, MANUAL SEARCH (◀◀, ▶▶), PLAY, RANDOM PLAY, TRACK SEARCH (◀◀, ▶▶), PAUSE, STOP	PSG-065

#### OTHERS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	V201 Fluorescent indicator tube Remote control sensor	PEL1022 GP1U52X

## ◎ Main Board Assembly (PWZ1603)

## SEMICONDUCTORS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1130QZ
	IC4	LH5116-15
	IC5	LC7881-C
	IC10	M51955AL
△	IC24,IC25	NJM4558D-D
△	IC11	NJM78M05FA
△	IC12	NJM79M05FA
	IC28	PD0084
△	IC6	PD4150A
△	IC16 – IC18	TA8410K
	Q6,Q11	DTA124ES
	Q12,Q19	DTC124ES
	Q1	2SA1399
	Q7	2SA933S
	Q5,Q8,Q9,Q16,Q17	2SC1740S
△	Q13,Q14	2SD1302
△	D25	WL02ML-5004
	D10	1SR139-100
	D17 – D20	1SS254

## SWITCH

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	S1 Tact switch (TEST MODE)	PSG-064

## CAPACITORS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	C2 – C4	CCCCH300J50
	C95,C96,C165	CCCCH270J50
	C40	CEANP4R7M25
	C16,C22	CEASR47M50
	C5,C10,C43	CEAS101M10
	C100,C101	CEAS222M16
	C48	CEAS3R3M50
	C7,C12,C15,C19,C20,C23,C26,	CEAS330M16
	C36,C38,C41,C50,C52 – C54,C56,	
	C57,C59,C63,C66,C69,C70,C97,C98	
	C92,C161	CCCSL101J50
	C88	CEAS101M35
	C71,C72,C93,C94	CEAS220M25
	C118	CEAS220M35
	C62	CEAS221M10
	C34	CEAS4R7M50
	C102,C103	CEAS471M10
	C61,C86,C91,C132,C133,C141,	CKCYF103Z50
	C143	
	C30,C51,C121,C122	CQMA102K50
	C131	CKCYF473Z50
	C14,C17,C46	CQMA103K50
	C31,C32,C35,C39	CQMA104K50
	C29	CQMA272J50
	C13	CQMA332J50

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	C73,C74	CQMA562J50
	C11,C21,C28,C37	CQMA333K50
	C75,C76	CQMA561J50
	C1,C27,C47	CQMA472J50
	C67,C68	CQMA683J50
	C77,C78	CQMA471J50

## RESISTORS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	R30 Metal thin film	RN1/6PQ3601F
	VR2 Semi-fixed (10k)	VRTB6VS103
	VR3 – VR7 Semi-fixed (22k)	VRTB6VS223
	VR8 Semi-fixed (1k)	VRTS6VS102
	Other resistors	RD1/6PM□□□J

## OTHERS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	JA1 2P Pin jack (OUTPUT)	PKB1009
	X3 Crystal resonator	PSS-012
	X1 Ceramic resonator	VSS1014
	JA3,JA4 Remote control jack	RKN1004

## Transformer Board Assembly

## CAPACITORS

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	C301,C303	CKPYF103Z50
	C302,C304 – C307	CKPYX103N25

## Switch Board Assembly

## SWITCHES

<u>Mark</u>	<u>Symbol &amp; Description</u>	<u>Part No.</u>
	S701 – S704 Slide switch (LOADING POSITION, MAGAZINE)	PSH1004

## 14. FOR PD-M510/KC, PD-M410/KU AND KC TYPES

### NOTES :

- Parts without part number cannot be supplied.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by “◎” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

### CONTRAST OF MISCELLANEOUS PARTS

The PD-M510/KC, PD-M410/KU and KC types are the same as the PD-M510/KU type with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		PD-M510 /KU type	PD-M510 /KC type	PD-M410 /KU type	PD-M410 /KC type	
	CD packing case	PHG1318	PHG1324	PHG1319	PHG1325	For packing
	Window	PAM1301	PAM1301	PAM1302	PAM1302	
	Front panel	PNW1534	PNW1534	PNW1535	PNW1535	
	Operating instructions (English)	PRB1090	• • • •	• • • •	• • • •	
	Operating instructions (English/French)	• • • •	PRE1090	• • • •	• • • •	For packing
	Operating instructions (English)	• • • •	• • • •	PRB1091	• • • •	For packing
	Operating instructions (English/French)	• • • •	• • • •	• • • •	PRE1091	For packing
◎	Main board assembly	PWZ1603	PWZ1603	PWZ1602	PWZ1602	
◎	Function board assembly	PWZ1612	PWZ1612	PWZ1611	PWZ1611	
	Remote control unit	PWW1034		• • • •	• • • •	

### MAIN BOARD ASSEMBLY (PWZ1602)

The main board assembly (PWZ1602) is the same as the main board assembly (PWZ1603) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1603	PWZ1602	
	D20	1SS254	• • • •	

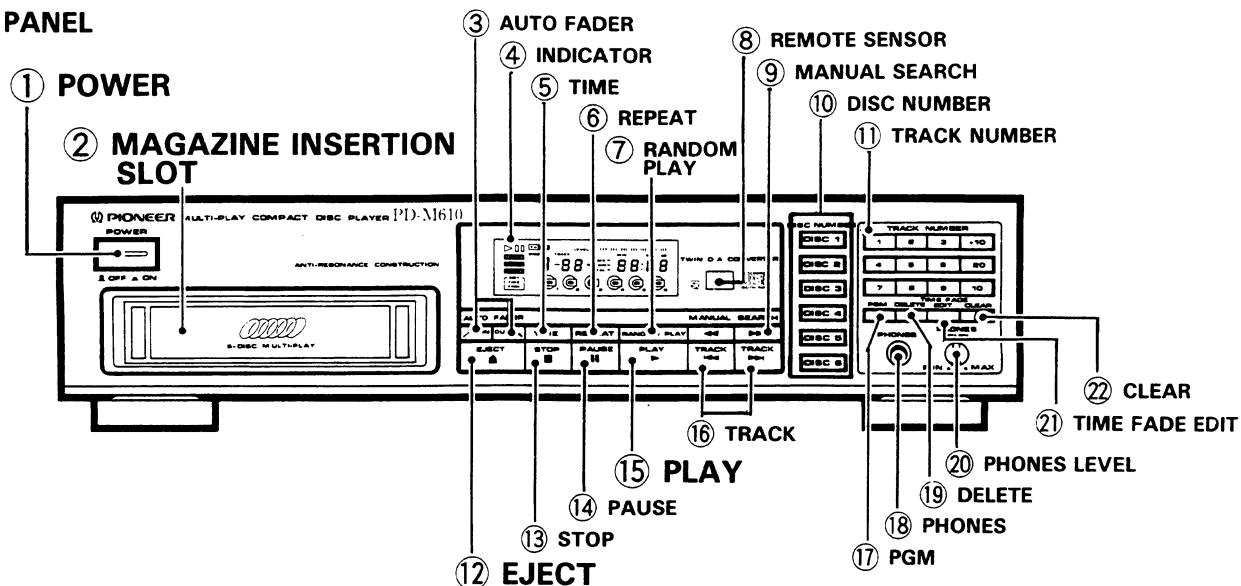
### FUNCTION BOARD ASSEMBLY (PWZ1611)

The function board assembly (PWZ1611) is the same as the function board assembly (PWZ1612) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1612	PWZ1611	
	Remote control sensor	GP1U52X	• • • •	

## 15. PANEL FACILITIES

### FRONT PANEL



#### ① POWER switch

Press to turn power to the unit ON and OFF.

#### ② Magazine insertion slot

#### ③ AUTO FADER

**IN key:**

Press this key to begin playback with fade-in. (Operable only during pause mode).

**OUT key**

Press to begin fade-out. (When fade-out ends, the player will enter the pause mode.)

#### ④ INDICATORS

##### DISC

: The disc being played or searched is displayed.

##### TRACK

: The number of the track or program currently playing is displayed.

##### 1 ▶ REP

: Lights during repeat playback of one track.

##### REP RANDOM

: Lights during repeat playback of all tracks.  
: Lights during random playback.

##### TIME/REMAIN/TOTAL

: Each time the TIME key is pressed, the display changes accordingly.

##### • TIME

: Displays the number and playing time of the track being played.

##### • REMAIN

: The remaining playback time (TRACK REMAIN) of the track being played is displayed (in minutes and seconds). Pressing the key once will display (in minutes and seconds) the remaining playback time (DISC REMAIN) of the disc being played.

##### • TOTAL

: This displays the total number of tracks (TRACK) on the disc and the disc's total playing time in minutes and seconds.

For programmed playback, the remaining time of the track being played and the total program step (TOTAL) of the program are displayed.

##### MIN

: Displays the minutes of the playback time and remaining time of the currently playing track.

##### SEC

: Displays the seconds of the playback time and remaining time of the currently playing track.

##### PROGRAM

: Lights when a program mode.

##### DELETE

: Lights when delete mode.

##### TIME FADE EDIT

: Lights when time fade editing has been set.

##### LEVEL

: The volume level of fade-in, fade-out and digital level control is displayed.

##### DISC Symbol

: The center bar of the disc symbol for the disc being played lights in red. When searching for discs not installed in the magazine, the corresponding disc mark will go off.

#### ⑤ TIME key

• Use to select the method for displaying time on the indicator panel. Each time the key is pressed, the indication changes from TIME, REMAIN (track remain) and REMAIN (disc remain: This will not be displayed during programmed playback.) to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

#### ⑥ REPEAT key

Press this key for repeat playback. Pressing the key once, twice, or three times will change the repeat mode from single track repeat, all tracks repeat, and repeat playback cancellation.

#### ⑦ RANDOM PLAY key

Press this key to start random playback or delete random playback.

#### ⑧ REMOTE SENSOR

#### ⑨ MANUAL SEARCH keys

When the player is in play or pause modes, these keys are pressed to perform fast forward or fast reverse operations, to allow manual searching. These operations are only carried out during the time either key is pressed.

**⑩ DISC NUMBER keys (1 – 6)**

Use to select disc numbers for playback or programming.

**⑪ TRACK NUMBER keys (1 to 10, +10 and ≥ 20)**

- These keys are used to specify the track numbers (tracks 1 to 99) for direct track selection or program entry.
- During time fade editing, the keys are used to specify the time period (in minutes).

**⑫ EJECT key**

Press to eject a magazine or the disc tray. When pressed, any magazine (in case of single magazine, the disc tray) inside is ejected forward.

**⑬ STOP key**

Press to stop playback. When pressed, the player stops all operations.

**⑭ PAUSE key**

Press to temporarily interrupt playback. When pressed again, the player is released from the pause mode.

**⑮ PLAY key**

Press to begin playback, and to release the player from the pause mode.

**⑯ TRACK SEARCH keys**

When the player is in the normal playback, programmed playback or pause modes, these keys are pressed to search for a desired track. Pressing either key causes the player to advance to the next track, or return to the previous track.

**⑰ PGM (PROGRAM) key**

This is used to program tracks to play a desired sequence.

- Press this key to set the unit to program mode. Then specify the desired disc and tracks with the DISC and TRACK NUMBER keys. The tracks will be programmed as they are entered in this way.

**⑱ PHONES (headphones) jack**

When you wish to use headphones, insert the plug for the headphones into the headphones jack.

**⑲ DELETE key**

Press this key to specify the undesired tracks for delete play or delete random play.

**⑳ PHONES LEVEL control knob**

Use to adjust the level of sound when using headphones. Turning the knob to the right increases the sound level.

**㉑ TIME FADE EDIT key**

Press to have a fade-out when playback reaches the end of the specified time.

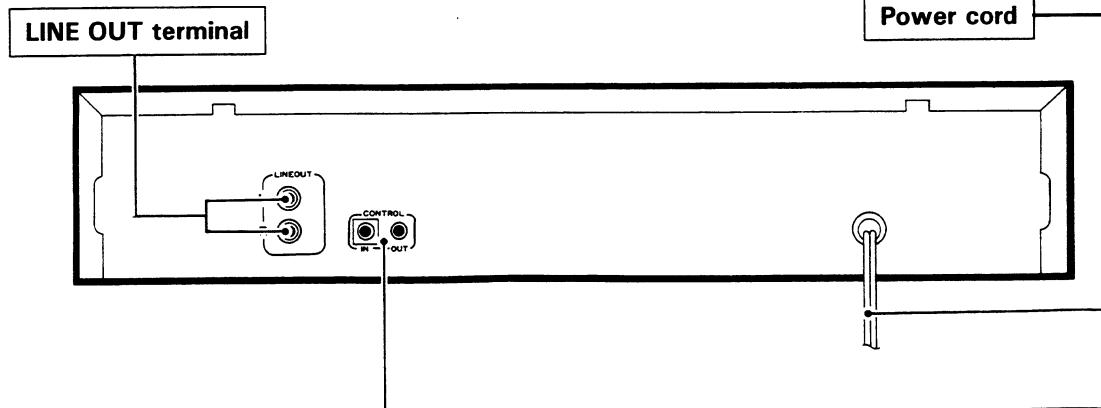
**㉒ CLEAR key**

Press this key during program entry or playback to clear the last program step. This will also cancel the time fade editing mode and delete mode.

**Audio glossary**

Fade-in: This is when the sound becomes audible gradually.

Fade-out: This is when the sound gradually becomes inaudible.

**REAR PANEL****CONTROL IN terminal (U.S. and Canadian models only)**

This terminal is for inputting the remote control signals relayed from an amplifier with a sensor for receiving control signals from a remote control unit and carrying the Pioneer  mark. For instructions regarding connection and operation, please refer to the operating instruction manual for your stereo amplifier.

**CONTROL OUT terminal (U.S. and Canadian models only)**

This terminal is for further relaying remote control signals to other components carrying the Pioneer  mark. Please connect to the control input terminal of the other component.

## 16. SPECIFICATIONS

### ● PD-M610

#### 1. General

Type .....	Compact disc digital audio system
<b>Power requirements</b>	
European models .....	AC 220 V, 50/60 Hz
U.K., Australian models .....	AC 240 V, 50/60 Hz
U.S., Canadian models .....	AC 120 V, 60 Hz
Other models .....	AC 110/120 - 127/240 V (switchable) 50/60 Hz
<b>Power consumption</b>	
European, U.K., Australian, U.S., Canadian models .....	13 W
Other models .....	13 W
Operating temperature .....	+5°C - +35°C
Weight .....	5.1 kg (11 lb, 4 oz)
External dimensions .....	420(W) x 327 (D) x 100 (H) mm 16-9/16(W) x 12-7/8 (D) x 3-15/16 (H) in

#### 2. Audio section

Frequency response .....	4 Hz - 20 kHz ( $\pm$ 0.5 dB) (EIAJ)
S/N ratio .....	more than 104 dB (EIAJ)
Dynamic range .....	more than 95 dB (EIAJ)
Channel separation .....	more than 98 dB (EIAJ)
Harmonic distortion .....	less than 0.005% (EIAJ)
Output voltage .....	2.0 V
Wow and flutter .....	less than $\pm$ 0.001% (W.PEAK) (below measurable level) (EIAJ)
Channels .....	2-channel (stereo)

#### 3. Output terminal

Audio line output	
Headphone jack (with volume control)	
Control input/output terminals (U.S. and Canadian models only)	

#### 4. Functions

Number of discs to be stored - maximum 6.

##### Basic operation keys

- PLAY, PAUSE, STOP

##### Search function

- Disc selection
- Track selection
- Manual search
- Track search

##### Programming

- Maximum 32 steps
- Pause
- Direct programming
- Program check/Correction (remote control unit only)
- Program clear (single track or all tracks)

##### Repeat functions

- 1 track repeat
- All discs repeat
- Program repeat
- Random play repeat
- Delete play repeat
- Delete random play repeat

##### Random play

- Random play (repeat also available)
- Delete random play (repeat also available)

##### Switching display

- Time consumed, remaining time, and total time

##### Timer start

##### Digital Level Controller

Volume control can be done with the remote control unit.

##### One-touch fade

Fade-in and fade-out possible.

##### Time fade editing

Fade-out with part specification is possible.

##### Except U.K. and European models

##### Remote control unit for program transmission

- Enables program transmission from remote control unit to player.
- LCD display
- Transmission indicator

#### 5. Display

##### FL tube display

- Passing time display (min, sec)
- Remaining time display
- Total time display
- Disc number, track number
- Program step number
- Program indicator
- Repeat indicator
- Random play indicator
- ATT level display
- Time fade editing indicator
- Delete indicator
- Play indicator
- Pause indicator
- Disc mark

#### 6. Accessoires

• Remote control unit .....	.1
• Size AAA/R03/dry batteries .....	.2
• Six-compact-disc magazine .....	.1
• Single-compact-disc magazine .....	.1
(Except U.K. and European models)	
• Output cable .....	.1
• Control cord .....	.1
(U.S. and Canadian models only)	
• Operating instructions .....	.1

##### NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

The Magazine Type Multi-Play CD Players with  mark and the Magazines with the same mark are compatible for 5-inch (12cm) discs.



## ● PD-M410

### 1. General

Type ..... Compact disc digital audio system  
Power requirements  
European models ..... AC 220V, 50/60Hz  
U.K., Australian models ..... AC 240V, 50/60Hz  
U.S., Canadian models ..... AC 120V, 60Hz  
Other models ..... AC 110/120–127/220/240V  
(switchable) 50/60Hz  
Power consumption ..... 11W  
Operating temperature ..... +5°C – +35°C  
(+41°F – +95°F)  
Weight ..... 4.9kg (10lb 13oz)  
External dimensions ..... 420(W) × 325(D) × 90(H) mm  
16-9/16(W) × 12-13/16(D) × 3-9/16(H) in

### 2. Audio section

Frequency response ..... 4Hz – 20kHz ( $\pm 0.5$ dB) (EIAJ)  
SN ratio ..... more than 102dB (EIAJ)  
Dynamic range ..... more than 90dB (EIAJ)  
Channel separation ..... more than 94dB (EIAJ)  
Output voltage ..... 1.8V  
Wow and flutter ..... less than ( $\pm 0.001\%$  W.PEAK)  
(below measurable level) (EIAJ)  
Channels ..... 2-channel (stereo)

### 3. Output Terminal

Audio line output  
Control input/output terminals

### 4. Functions

Number of discs to be stored – maximum 6.

Basic operation keys  
● PLAY, PAUSE, STOP

#### Search function

- Disc selection (6 keys)
- Manual search
- Track search

#### Programming

- Maximum 32 steps
- Pause
- Direct programming
- Program clear

#### Timer start

- Timer start play

#### Repeat functions

- All-discs repeat
- Program repeat
- Random play repeat

#### Random Play

- Random play

#### Switching display

- Time consumed, remaining time, and total time

### 5. Display

FL tube display  
● Passing time display (min, sec)  
● Remaining time display  
● Total time display  
● Disc number, track number  
● Program step number  
● Program indicator  
● Repeat indicator  
● Random play indicator  
● Play indicator  
● Pause indicator  
● Disc mark

### 6. Accessories

● Six-compact-disc magazine	1
● Control cord	1
● Output cable	1
● Operating instructions	1

#### NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

The Magazine Type Multi-Play CD Players with  mark and the Magazines with the same mark are compatible for 5-inch (12cm) discs.